

CD9A3 Series

COM Express Mini

User's Manual

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COM Express Specification Reference

PICMG® COM Express Module™ Base Specification.

<http://www.picmg.org/>

FCC and DOC Statement on Class B

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio TV technician for help.

Notice:

1. The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
2. Shielded interface cables must be used in order to comply with the emission limits.

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About this Manual

An electronic file of this manual is included in the CD. To view the user's manual in the CD, insert the CD into a CD-ROM drive. The autorun screen (Main Board Utility CD) will appear. Click "User's Manual" on the main menu.

Warranty

1. Warranty does not cover damages or failures that arised from misuse of the product, inability to use the product, unauthorized replacement or alteration of components and product specifications.
2. The warranty is void if the product has been subjected to physical abuse, improper installation, modification, accidents or unauthorized repair of the product.
3. Unless otherwise instructed in this user's manual, the user may not, under any circumstances, attempt to perform service, adjustments or repairs on the product, whether in or out of warranty. It must be returned to the purchase point, factory or authorized service agency for all such work.
4. We will not be liable for any indirect, special, incidental or consequential damages to the product that has been modified or altered.

Static Electricity Precautions

It is quite easy to inadvertently damage your PC, system board, components or devices even before installing them in your system unit. Static electrical discharge can damage computer components without causing any signs of physical damage. You must take extra care in handling them to ensure against electrostatic build-up.

1. To prevent electrostatic build-up, leave the system board in its anti-static bag until you are ready to install it.
2. Wear an antistatic wrist strap.
3. Do all preparation work on a static-free surface.
4. Hold the device only by its edges. Be careful not to touch any of the components, contacts or connections.
5. Avoid touching the pins or contacts on all modules and connectors. Hold modules or connectors by their ends.



Important:

Electrostatic discharge (ESD) can damage your processor, disk drive and other components. Perform the upgrade instruction procedures described at an ESD workstation only. If such a station is not available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to a metal part of the system chassis. If a wrist strap is unavailable, establish and maintain contact with the system chassis throughout any procedures requiring ESD protection.

Safety Measures

To avoid damage to the system:

- Use the correct AC input voltage range.

To reduce the risk of electric shock:

- Unplug the power cord before removing the system chassis cover for installation or servicing. After installation or servicing, cover the system chassis before plugging the power cord.

About the Package

The package contains the following items. If any of these items are missing or damaged, please contact your dealer or sales representative for assistance.

- One CD9A3 board
- One DVD
- One QR (Quick Reference)

Optional Items

- COM100-B carrier board kit
- Heat sink
- Heat sink with fan

The board and accessories in the package may not come similar to the information listed above. This may differ in accordance with the sales region or models in which it was sold. For more information about the standard package in your region, please contact your dealer or sales representative.

Before Using the System Board

Before using the system board, prepare basic system components.

If you are installing the system board in a new system, you will need at least the following internal components.

- Storage devices such as hard disk drive, CD-ROM, etc.

You will also need external system peripherals you intend to use which will normally include at least a keyboard, a mouse and a video display monitor.

Chapter 1 - Introduction

Specifications

Processor	<ul style="list-style-type: none"> CD9A3-25B20: <ul style="list-style-type: none"> - Intel® Atom™ D2550, 1.86GHz, 2x 512K L2, 10W TDP, dual-core - Cooling option: heatsink with cooling fan CD9A3-28B20: <ul style="list-style-type: none"> - Intel® Atom™ N2800, 1.86GHz, 2x 512K L2, 6.5W TDP, dual-core - Cooling option: heatsink (fanless solution) CD9A3-26B20: <ul style="list-style-type: none"> - Intel® Atom™ N2600, 1.6GHz, 2x 512K L2, 3.5W TDP, dual-core - Cooling option: heatsink (fanless solution)
Chipset	<ul style="list-style-type: none"> Intel® NM10 Express chipset
System Memory	<ul style="list-style-type: none"> 2GB DDR3 onboard
Graphics	<ul style="list-style-type: none"> Intel® GMA 3650 (Intel® Atom™ D2550/N2800) Intel® GMA 3600 (Intel® Atom™ N2600) Display outputs: <ul style="list-style-type: none"> - 1 LVDS - 1 DDI: HDMI, DVI, DisplayPort Display resolution: <ul style="list-style-type: none"> - LVDS display resolution up to 1440x900, 18/24bit (Intel® Atom™ D2550) - LVDS display resolution up to 1366x768, 18bit (Intel® Atom™ N2800/ N2600) - HDMI/DVI resolution up to 1920x1200 - DisplayPort resolution up to 1600x1200 Supports Hardware H.264/AVC, MPEG-2 video decoder, VC-1, DirectX 9, 1080p decoder
Audio	<ul style="list-style-type: none"> Supports High Definition Audio interface
LAN	<ul style="list-style-type: none"> Intel® I210AT Gigabit Ethernet Controller Integrated 10/100/1000 transceiver Fully compliant with IEEE 802.3, IEEE 802.3u, IEEE 802.3ab Supports wire management
Serial ATA	<ul style="list-style-type: none"> Supports 2 Serial ATA interfaces SATA 2.0 with data transfer rate up to 3Gb/s Integrated Advanced Host Controller Interface (AHCI) controller
SSD (Optional)	<ul style="list-style-type: none"> 4GB/8GB/16GB/32GB Write: 30MB/sec (max), Read: 70MB/sec (max) SATA to SSD onboard
Watchdog Timer (optional)	<ul style="list-style-type: none"> Watchdog timeout programmable via software from 1 to 256 seconds

Expansion Interfaces	<ul style="list-style-type: none"> Supports 8 USB 2.0 ports Supports 3 PCIe x1 interfaces Supports LPC interface Supports SMBus interface Supports I²C interface Supports 2 serial interfaces (TX/RX) Supports 8-bit Digital I/O
Damage Free Intelligence	<ul style="list-style-type: none"> Monitors CPU temperature Monitors CPU fan speed Monitors Vcore/VCCRTC/DDR3 voltages Watchdog timer function
BIOS	<ul style="list-style-type: none"> 16Mbit SPI BIOS
OS Support	<ul style="list-style-type: none"> Windows XP Professional x86 & SP3 (32-bit) Windows 7 Ultimate x86 & SP1 (32-bit)
Temperature	<ul style="list-style-type: none"> Operating: 0°C to 60°C Storage: -40°C to 85°C
Humidity	<ul style="list-style-type: none"> 10% to 90%
Power	<ul style="list-style-type: none"> 4.75~20V, 5VSB, VCC_RTC (ATX mode) 4.75~20V, VCC_RTC (AT mode)
PCB	<ul style="list-style-type: none"> Dimensions <ul style="list-style-type: none"> - COM Express® Mini - 84mm (3.30") x 55mm (2.16") Compliance <ul style="list-style-type: none"> - PICMG COM Express® R2.1, Type 10

Features

• Watchdog Timer

The Watchdog Timer function allows your application to regularly “clear” the system at the set time interval. If the system hangs or fails to function, it will reset at the set time interval so that your system will continue to operate.

• DDR3

DDR3 delivers increased system bandwidth and improved performance. The advantages of DDR3 are its higher bandwidth and its increase in performance at a lower power than DDR2.

• Graphics

The integrated Intel® HD graphics engine delivers an excellent blend of graphics performance and features to meet business needs. It provides excellent video and 3D graphics with outstanding graphics responsiveness. These enhancements deliver the performance and compatibility needed for today's and tomorrow's business applications. Supports LVDS and DDI (HDMI, DVI and DisplayPort) for up to 2 independent displays.

• Serial ATA

Serial ATA is a storage interface that is compliant with SATA 1.0a specification. With speed of up to 3Gb/s (SATA 2.0), it improves hard drive performance faster than the standard parallel ATA whose data transfer rate is 100MB/s.

• Gigabit LAN

The Intel® I210AT Gigabit LAN controller supports up to 1Gbps data transmission.

• USB

The system board supports USB 2.0 and USB 1.1 ports. USB 1.1 supports 12Mb/second bandwidth while USB 2.0 supports 480Mb/second bandwidth providing a marked improvement in device transfer speeds between your computer and a wide range of simultaneously accessible external Plug and Play peripherals.

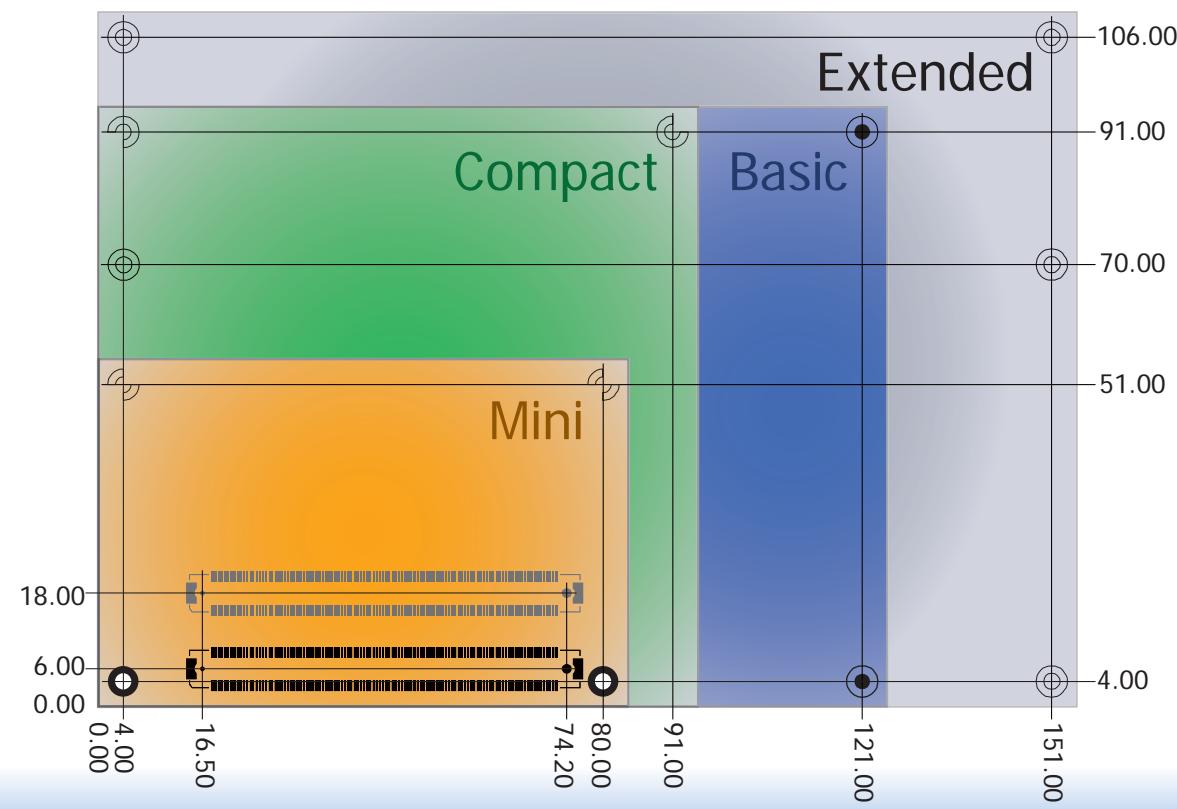
Chapter 2 - Concept

COM Express Module Standards

The figure below shows the dimensions of the different types of COM Express modules.

CD9A3 Series is a COM Express Mini. The dimension is 84mm x 55mm.

- Common for all Form Factors
- Extended only
- Basic only
- Compact only
- Compact and Basic only
- Mini only



Specification Comparison Table

The table below shows the COM Express standard specifications and the corresponding specifications supported on the CD9A3 Series module.

Connector	Feature	COM Express Module Base Specification Type 10 (No IDE or PCI, add DDI + USB3) Min / Max	DFI CD9A3 Series Type 10
System I/O			
A-B	PCI Express Lanes 0 - 5	1 / 4	3
A-B	LVDS Channel A	0 / 1	1
A-B	LVDS Channel B	NA	NA
A-B	eDP on LVDS CH A pins	0 / 1	0
A-B	VGA Port	NA	NA
A-B	TV-Out	NA	NA
A-B	DDI 0	0/1	1
A-B ⁵	Serial Ports 1 - 2	0 / 2	2
A-B	CAN interface on SER1	0 / 1	0
A-B	SATA / SAS Ports	1 / 2	2
A-B	AC'97 / HDA Digital Interface	0 / 1	1
A-B	USB 2.0 Ports	4 / 8	8
A-B	USB Client	0 / 1	0
A-B	USB 3.0 Ports	0/2	0
A-B	LAN Port 0	1 / 1	1
A-B	Express Card Support	0/2	2
A-B	LPC Bus	1 / 1	1
A-B	SPI	1 / 2	1
System Management			
A-B ⁶	SDIO (muxed on GPIO)	0 / 1	0
A-B	General Purpose I/O	8 / 8	8
A-B	SMBus	1 / 1	1
A-B	I2C	1 / 1	1
A-B	Watchdog Timer	0 / 1	1
A-B	Speaker Out	1 / 1	1
A-B	External BIOS ROM Support	0 / 2	1
A-B	Reset Functions	1 / 1	1



Note:

- 5 Indicates 12V-tolerant features on former VCC_12V signals.
- 6 Cells in the connected columns spanning rows provide a rough approximation of features sharing connector pins.

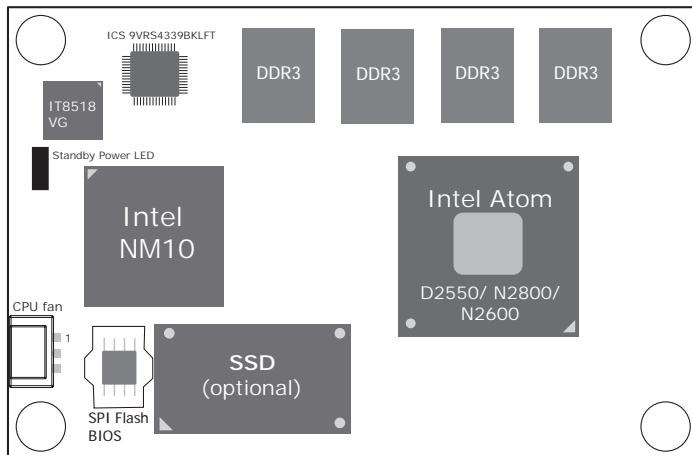
Connector	Feature	COM Express Module Base Specification Type 6 (No IDE or PCI, add DDI + USB3) Min / Max	DFI CD9A3 Series Type 10
Power Management			
A-B	Thermal Protection	0 / 1	1
A-B	Battery Low Alarm	0 / 1	1
A-B	Suspend/Wake Signals	0 / 3	3
A-B	Power Button Support	1 / 1	1
A-B	Power Good	1 / 1	1
A-B	VCC_5V_SBY Contacts	4 / 4	4
A-B ⁵	Sleep Input	0 / 1	1
A-B ⁵	Lid Input	0 / 1	1
A-B ⁵	Fan Control Signals	0 / 2	2
A-B	Trusted Platform Modules	0 / 1	0
Power			
A-B	VCC_12V Contacts	12 / 12	12

Module Pin-out - Required and Optional Features C-D Connector. PICMG® COM.0Revision 2.1

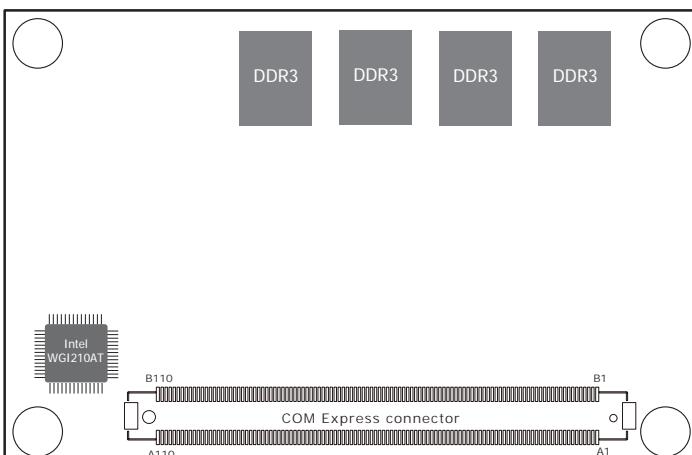
Connector	Feature	COM Express Module Base Specification Type 10 (No IDE or PCI, add DDI + USB3) Min / Max	DFI CD9A3 Series Type 10
System I/O			
C-D	PCI Express Lanes 16 - 31	NA	NA
C-D	PCI Express Graphics (PEG)	NA	NA
C-D ⁶	Muxed SDVO Channels 1 - 2	NA	NA
C-D ⁶	PCI Express Lanes 6 - 15	NA	NA
C-D ⁶	PCI Bus - 32 Bit	NA	NA
C-D ⁶	PATA Port	NA	NA
C-D ⁶	LAN Ports 1 - 2	NA	NA
C-D ⁶	DDIs 1 - 3	NA	NA
C-D ⁶	USB 3.0 Ports	NA	NA
Power			
C-D	VCC_12V Contacts	NA	NA

Chapter 3 - Hardware Installation

Board Layout

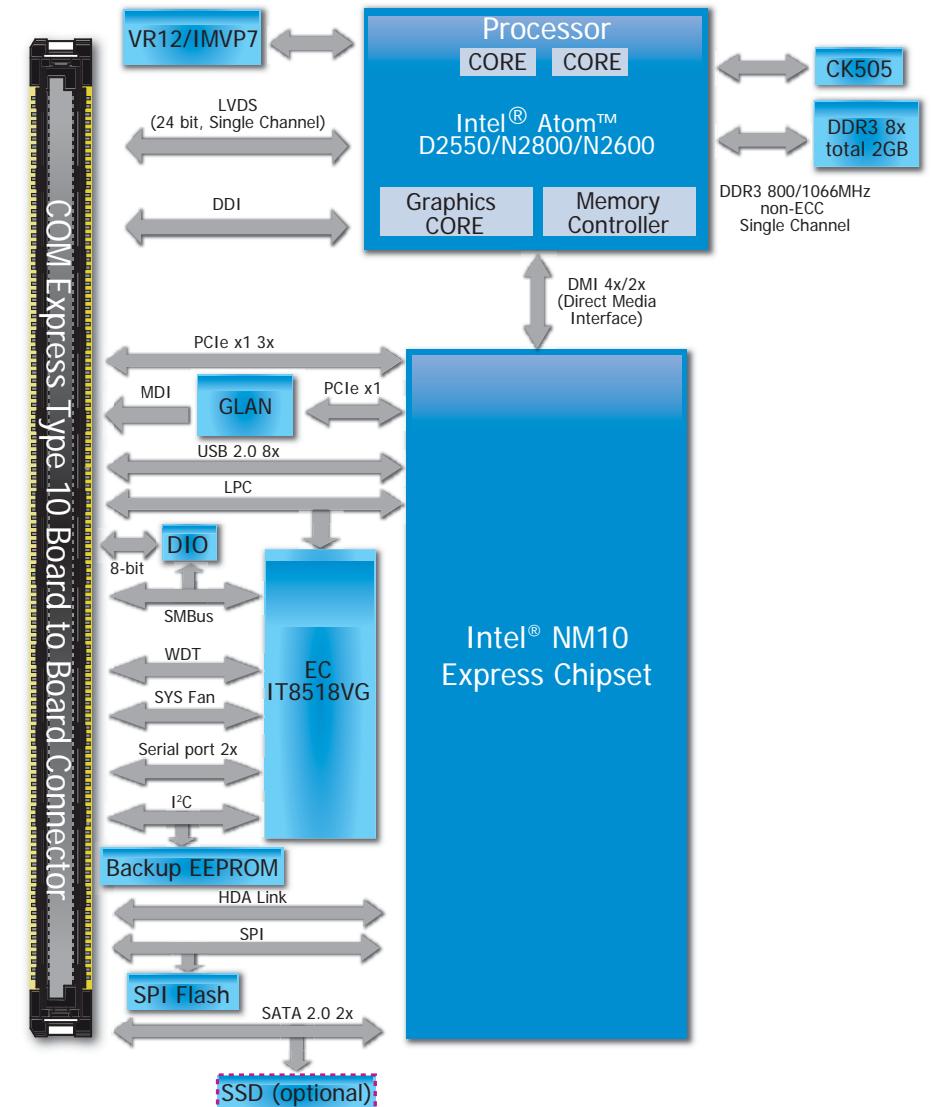


Top View



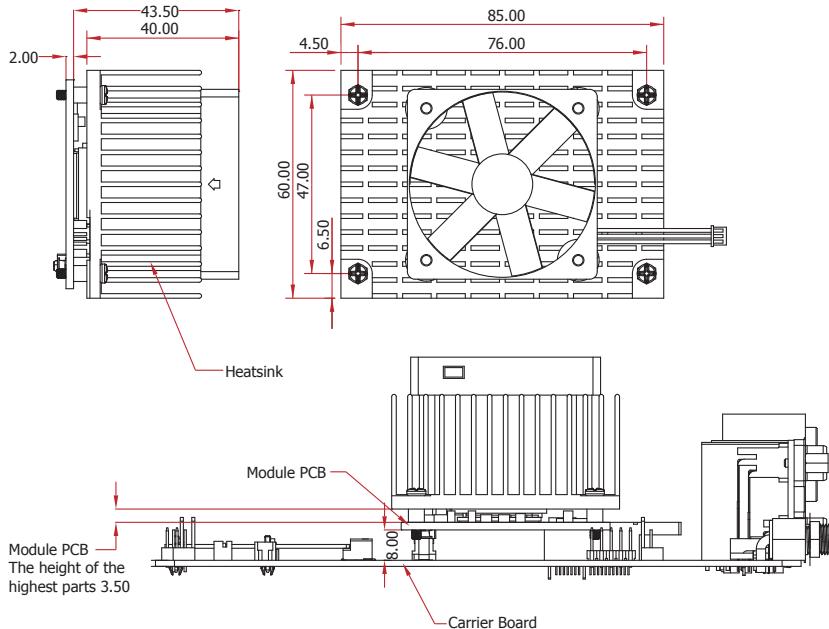
Bottom View

Block Diagram



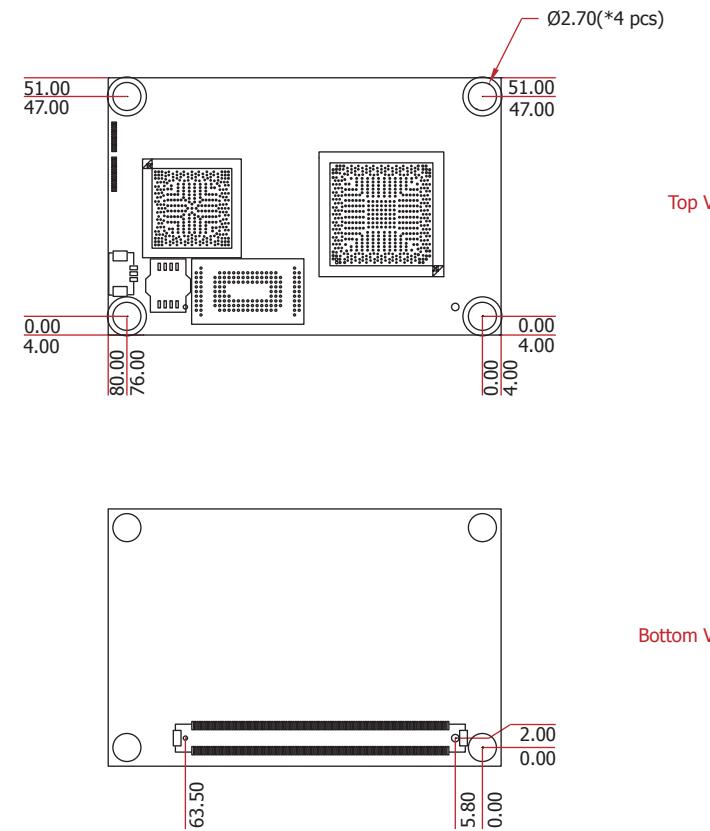
Mechanical Diagram

CD9A3 Series Module with Heat Sink



Side View of the Module with Heat Sink and Carrier Board

CD9A3 Series Module



**Important:**

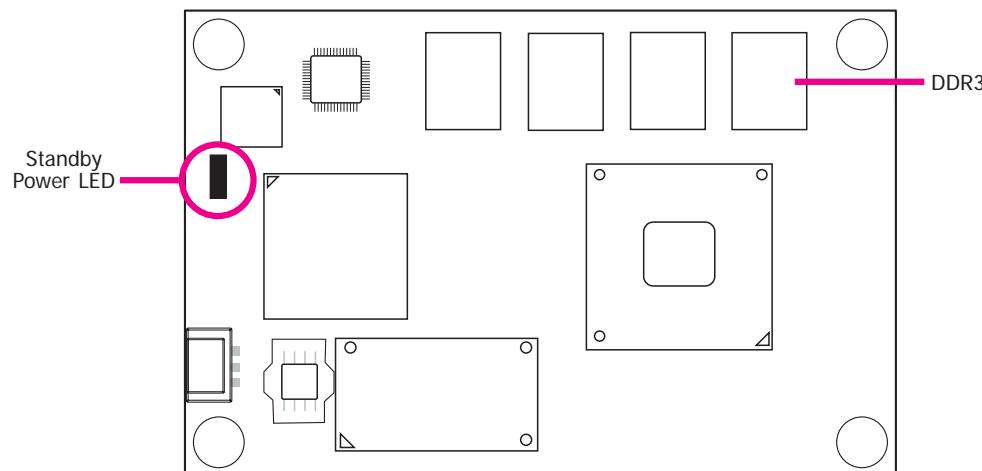
Electrostatic discharge (ESD) can damage your board, processor, disk drives, add-in boards, and other components. Perform installation procedures at an ESD workstation only. If such a station is not available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to a metal part of the system chassis. If a wrist strap is unavailable, establish and maintain contact with the system chassis throughout any procedures requiring ESD protection.

System Memory

The system board is equipped with eight DDR3 memory chips onboard.

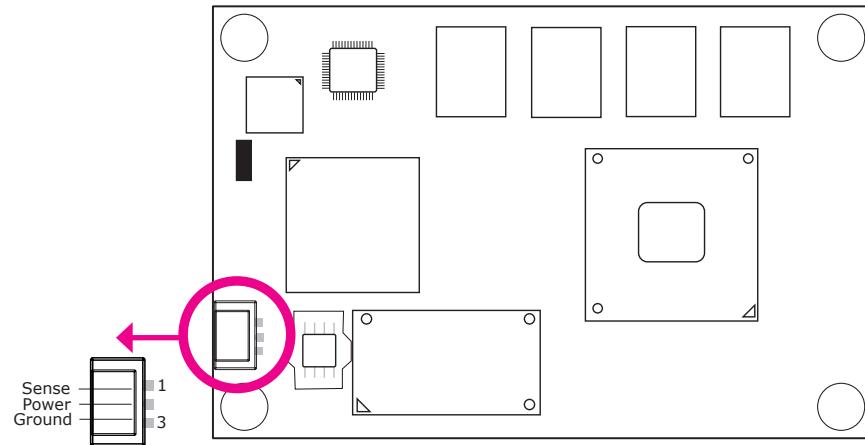
**Important:**

When the Standby Power LED lit red, it indicates that there is power on the board. Power-off the PC then unplug the power cord prior to installing any devices. Failure to do so will cause severe damage to the board and components.



Connectors

CPU Fan Connector



Connect the CPU fan's cable connector to the CPU fan connector on the board. The cooling fan will provide adequate airflow throughout the chassis to prevent overheating the CPU and board components.

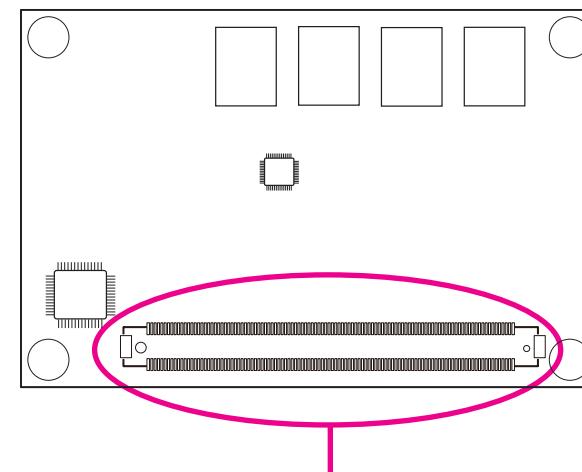
BIOS Setting

"Module Board H/W Monitor" submenu in the Advanced menu of the BIOS will display the current speed of the cooling fan. Refer to chapter 3 of the manual for more information.

COM Express Connectors

The COM Express connectors are used to interface the CD9A3 COM Express board to a carrier board. Connect the COM Express connectors (located on the solder side of the board) to the COM Express connectors on the carrier board.

Refer to the "Installing CD9A3 Series onto a Carrier Board" section for more information.



Refer to the following pages for the pin functions of these connectors.

COM Express Connectors

Row A		Row B	
A1	GND (FIXED)	B1	GND (FIXED)
A2	GBE0_MDI3-	B2	GBE0_ACT#
A3	GBE0_MDI3+	B3	LPC_FRAME#
A4	GBE0_LINK100#	B4	LPC_AD0
A5	GBE0_LINK1000#	B5	LPC_AD1
A6	GBE0_MDI2-	B6	LPC_AD2
A7	GBE0_MDI2+	B7	LPC_AD3
A8	GBE0_LINK#	B8	LPC_DRQ0#
A9	GBE0_MDI1-	B9	LPC_DRQ1#
A10	GBE0_MDI1+	B10	LPC_CLK
A11	GND (FIXED)	B11	GND (FIXED)
A12	GBE0_MDI0-	B12	PWRBTN#
A13	GBE0_MDI0+	B13	SMB_CK
A14	GBE0_CTREF	B14	SMB_DAT
A15	SUS_S3#	B15	SMB_ALERT#
A16	SATA0_TX+	B16	SATA1_TX+
A17	SATA0_TX-	B17	SATA1_TX-
A18	SUS_S4#	B18	SUS_STAT#
A19	SATA0_RX+	B19	SATA1_RX+
A20	SATA0_RX-	B20	SATA1_RX-
A21	GND (FIXED)	B21	GND (FIXED)
A22	USB_SSRX0-	B22	USB_SSTX0-
A23	USB_SSRX0+	B23	USB_SSTX0+
A24	SUS_S5#	B24	PWR_OK
A25	USB_SSRX1-	B25	USB-SSTX1-
A26	USB_SSRX1+	B26	USB-SSTX1+
A27	BATLOW#	B27	WDT
A28	(S)ATA_ACT#	B28	AC/HDA_SDIN2
A29	AC/HDA_SYNC	B29	AC/HDA_SDIN1
A30	AC/HDA_RST#	B30	AC/HDA_SDIN0

Row A		Row B	
A31	GND (FIXED)	B31	GND (FIXED)
A32	AC/HDA_BITCLK	B32	SPKR
A33	AC/HDA_SDOUT	B33	I2C_CK
A34	BIOS_DIS0#	B34	I2C_DAT
A35	THRMTRIP#	B35	THRM#
A36	USB6-	B36	USB7-
A37	USB6+	B37	USB7+
A38	USB_6_7_OC#	B38	USB_4_5_OC#
A39	USB4-	B39	USB5-
A40	USB4+	B40	USB5+
A41	GND (FIXED)	B41	GND (FIXED)
A42	USB2-	B42	USB3-
A43	USB2+	B43	USB3+
A44	USB_2_3_OC#	B44	USB_0_1_OC#
A45	USB0-	B45	USB1-
A46	USB0+	B46	USB1+
A47	VCC_RTC	B47	EXCD1_PERST#
A48	EXCD0_PERST#	B48	EXCD1_CPPE#
A49	EXCD0_CPPE#	B49	SYS_RESET#
A50	LPC_SERIRQ	B50	CB_RESET#
A51	GND (FIXED)	B51	GND (FIXED)
A52	RSVD	B52	RSVD
A53	RSVD	B53	RSVD
A54	GPIO	B54	GPIO1
A55	RSVD	B55	RSVD

Row A		Row B	
A56	RSVD	B56	RSVD
A57	GND	B57	GPO2
A58	PCIE_TX3+	B58	PCIE_RX3+
A59	PCIE_TX3-	B59	PCIE_RX3-
A60	GND (FIXED)	B60	GND (FIXED)
A61	PCIE_TX2+	B61	PCIE_RX2+
A62	PCIE_TX2-	B62	PCIE_RX2-
A63	GPI1	B63	GPO3
A64	PCIE_TX1+	B64	PCIE_RX1+
A65	PCIE_TX1-	B65	PCIE_RX1-
A66	GND	B66	WAKE0#
A67	GPI2	B67	WAKE1#
A68	PCIE_TX0+	B68	PCIE_RX0+
A69	PCIE_TX0-	B69	PCIE_RX0-
A70	GND(FIXED)	B70	GND (FIXED)
A71	LVDS_A0+	B71	DDI0_PAIR0+
A72	LVDS_A0-	B72	DDI0_PAIR0-
A73	LVDS_A1+	B73	DDI0_PAIR1+
A74	LVDS_A1-	B74	DDI0_PAIR1-
A75	LVDS_A2+	B75	DDI0_PAIR2+
A76	LVDS_A2-	B76	DDI0_PAIR2-
A77	LVDS_VDD_EN	B77	DDI0_PAIR4+
A78	LVDS_A3+	B78	DDI0_PAIR4-
A79	LVDS_A3-	B79	LVDS_BKLT_EN
A80	GND (FIXED)	B80	GND (FIXED)
A81	LVDS_A_CK+	B81	DDI0_PAIR3+
A82	LVDS_A_CK-	B82	DDI0_PAIR3-
A83	LVDS_I2C_CK	B83	LVDS_BKLT_CTRL
A84	LVDS_I2C_DAT	B84	VCC_5V_SBY
A85	GPI3	B85	VCC_5V_SBY

Row A		Row B	
A86	RSVD	B86	VCC_5V_SBY
A87	eDP_HPD	B87	VCC_5V_SBY
A88	PCIE_CLK_REF+	B88	BIOS_DIS1#
A89	PCIE0_CK_REF-	B89	DD0_HPD
A90	GND (FIXED)	B90	GND (FIXED)
A91	SPI_POWER	B91	DDI0_PAIR5+
A92	SPI_MISO	B92	DDI0_PAIR5-
A93	GPO0	B93	DDI0_PAIR6+
A94	SPI_CLK	B94	DDI0_PAIR6-
A95	SPI_MOSI	B95	DDI0_DDC_AUX_SEL
A96	TPM_PP	B96	USB_HOST_PRSNT
A97	TYPE10#	B97	SPI_CS#
A98	SER0_TX	B98	DDI0_CTRLCLK_AUX+
A99	SER0_RX	B99	DDI0_CTRLCLK_AUX-
A100	GND (FIXED)	B100	GND (FIXED)
A101	SER1_TX	B101	FAN_PWMOUT
A102	SER1_RX	B102	FAN_TACHIN
A103	LID#	B103	SLEEP#
A104	VCC_12V	B104	VCC_12V
A105	VCC_12V	B105	VCC_12V
A106	VCC_12V	B106	VCC_12V
A107	VCC_12V	B107	VCC_12V
A108	VCC_12V	B108	VCC_12V
A109	VCC_12V	B109	VCC_12V
A110	GND (FIXED)	B110	GND (FIXED)

COM Express Connectors Signal Description

Pin Types
 I Input to the Module
 O Output from the Module
 I/O Bi-directional input / output signal
 OD Open drain output

AC97/HDA Signals Descriptions

Signal	Pin#	Pin Type	Pwr Rail /Tolerance	CD9A3 Series	Carrier Board	Description
AC/HAD_RST#	A30	O CMOS	3.3V Suspend/3.3V		Connect to CODEC pin 11 RESET#	Reset output to CODEC, active low.
AC/HDA_SYNC	A29	O CMOS	3.3V/3.3V		Connect to CODEC pin 10 SYNC	Sample-synchronization signal to the CODEC(s).
AC/HDA_BTCLK	A32	I/O CMOS	3.3V/3.3V		Connect to CODEC pin 6 BIT_CLK	Serial data clock generated by the external CODEC(s).
AC/HDA_SDOOUT	A33	O CMOS	3.3V/3.3V		Connect to CODEC pin 5 SDATA_OUT	Serial TDM data output to the CODEC.
AC/HDA_SDIN2	B28	I/O CMOS	3.3V Suspend/3.3V		Connect 33 Ω in series to CODEC2 pin 8 SDATA_IN	
AC/HDA_SDIN1	B29	I/O CMOS	3.3V Suspend/3.3V		Connect 33 Ω in series to CODEC1 pin 8 SDATA_IN	Serial TDM data inputs from up to 3 CODECs.
AC/HDA_SDIN0	B30	I/O CMOS	3.3V Suspend/3.3V		Connect 33 Ω in series to CODEC0 pin 8 SDATA_IN	

Gigabit Ethernet Signals Descriptions

Signal	Pin#	Pin Type	Pwr Rail /Tolerance	CD9A3 Series	Carrier Board	Description
GBEO_MDI0+	A13	I/O Analog	3.3V max Suspend		Connect to Magnetics Module MDI0+/-	Gigabit Ethernet Controller 0: Media Dependent Interface Differential Pairs 0,1,2,3. The MDI can operate in 1000, 100 and 10 Mbit / sec modes. Some pairs are unused in some modes, per the following:
GBEO_MDI0-	A12	I/O Analog	3.3V max Suspend		Connect to Magnetics Module MDI1+/-	
GBEO_MDI1+	A10	I/O Analog	3.3V max Suspend		Connect to Magnetics Module MDI2+/-	
GBEO_MDI1-	A9	I/O Analog	3.3V max Suspend		Connect to Magnetics Module MDI3+/-	
GBEO_MDI2+	A7	I/O Analog	3.3V max Suspend			MDI[0]+/- B1_DA+/- TX+/- TX+/-
GBEO_MDI2-	A6	I/O Analog	3.3V max Suspend			MDI[1]+/- B1_DB+/- RX+/- RX+/-
GBEO_MDI3+	A3	I/O Analog	3.3V max Suspend			MDI[2]+/- B1_DC+/-
GBEO_MDI3-	A2	I/O Analog	3.3V max Suspend			MDI[3]+/- B1_DD+/-
GBEO_ACT#	B2	OD CMOS	3.3V Suspend/3.3V		Connect to LED and recommend current limit resistor 150Ω to 3.3VSB	Gigabit Ethernet Controller 0 activity indicator, active low.
GBEO_LINK#	A8	OD CMOS	3.3V Suspend/3.3V		NC	Gigabit Ethernet Controller 0 link indicator, active low.
GBEO_LINK100#	A4	OD CMOS	3.3V Suspend/3.3V		Connect to LED and recommend current limit resistor 150Ω to 3.3VSB	Gigabit Ethernet Controller 0 100 Mbit / sec link indicator, active low.
GBEO_LINK1000#	A5	OD CMOS	3.3V Suspend/3.3V		Connect to LED and recommend current limit resistor 150Ω to 3.3VSB	Gigabit Ethernet Controller 0 1000 Mbit / sec link indicator, active low.

SATA Signals Descriptions

Signal	Pin#	Pin Type	Pwr Rail /Tolerance	CD9A3 Series	Carrier Board	Description
SATA0_TX+	A16	O SATA	AC coupled on Module	AC Coupling capacitor	Connect to SATA0 Conn TX pin	Serial ATA or SAS Channel 0 transmit differential pair.
SATA0_RX-	A17	O SATA	AC coupled on Module	AC Coupling capacitor		
SATA0_RX+	A19	I SATA	AC coupled on Module	AC Coupling capacitor	Connect to SATA0 Conn RX pin	Serial ATA or SAS Channel 0 receive differential pair.
SATA0_RX-	A20	I SATA	AC coupled on Module	AC Coupling capacitor		
SATA1_TX+	B16	O SATA	AC coupled on Module	AC Coupling capacitor	Connect to SATA1 Conn TX pin	Serial ATA or SAS Channel 1 transmit differential pair.
SATA1_RX-	B17	O SATA	AC coupled on Module	AC Coupling capacitor		
SATA1_RX+	B19	I SATA	AC coupled on Module	AC Coupling capacitor	Connect to SATA1 Conn RX pin	Serial ATA or SAS Channel 1 receive differential pair.
SATA1_RX-	B20	I SATA	AC coupled on Module	AC Coupling capacitor		
ATA_ACT#	A28	I/O CMOS	3.3V / 3.3V	PU 10K to 3.3V	Connect to LED and recommend current limit resistor 220Ω to 3.3V	ATA (parallel and serial) or SAS activity indicator, active low.

PCI Express Lanes Signals Descriptions

Signal	Pin#	Pin Type	Pwr Rail /Tolerance	CD9A3 Series	Carrier Board	Description
PCIE_TX0+	A68	O PCIE	AC coupled on Module	AC Coupling capacitor	Connect to PCIE device or slot	PCI Express Differential Transmit Pairs 0
PCIE_RX0-	A69			AC Coupling capacitor		
PCIE_RX0+	B68	I PCIE	AC coupled off Module		Device - Connect AC Coupling cap 0.1uF Slot - Connect to PCIE Conn pin	PCI Express Differential Receive Pairs 0
PCIE_RX0-	B69					
PCIE_TX1+	A64	O PCIE	AC coupled on Module	AC Coupling capacitor	Connect to PCIE device or slot	PCI Express Differential Transmit Pairs 1
PCIE_TX1-	A65			AC Coupling capacitor		
PCIE_RX1+	B64	I PCIE	AC coupled off Module		Device - Connect AC Coupling cap 0.1uF Slot - Connect to PCIE Conn pin	PCI Express Differential Receive Pairs 1
PCIE_RX1-	B65					
PCIE_TX2+	A61	O PCIE	AC coupled on Module	AC Coupling capacitor	Connect to PCIE device or slot	PCI Express Differential Transmit Pairs 2
PCIE_RX2-	A62			AC Coupling capacitor		
PCIE_RX2+	B61	I PCIE	AC coupled off Module		Device - Connect AC Coupling cap 0.1uF Slot - Connect to PCIE Conn pin	PCI Express Differential Receive Pairs 2
PCIE_RX2-	B62					
PCIE_TX3+	A58	O PCIE	AC coupled on Module	NA	NA	PCI Express Differential Transmit Pairs 3 (NA for CD9A3)
PCIE_RX3-	A59			NA	NA	
PCIE_RX3+	B58	I PCIE	AC coupled off Module	NA	NA	PCI Express Differential Receive Pairs 3 (NA for CD9A3)
PCIE_RX3-	B59			NA	NA	
PCIE_CK_REF+	A88	O PCIE	PCIE		Connect to PCIE device, PCIe CLK Buffer or slot	Reference clock output for all PCI Express and PCI Express Graphics lanes.
PCIE_CK_REF-	A89					

ExpressCard Signals Descriptions						
Signal	Pin#	Pin Type	Pwr Rail /Tolerance	CD9A3 Series	Carrier Board	Description
EXCD0_CPE#	A49	I CMOS	3.3V /3.3V	PU 10k to 3.3V		PCI ExpressCard: PCI Express capable card request, active low, one per card
EXCD1_CPE#	B48			PU 10k to 3.3V		
EXCD0_PERST#	A48	O CMOS	3.3V /3.3V			PCI ExpressCard: reset, active low, one per card
EXCD1_PERST#	B47					

DDI Signals Descriptions						
Signal	Pin#	Pin Type	Pwr Rail /Tolerance	CD9A3 Series	Carrier Board	Description
DDI1_PAIR0+/DPO_LANE0+	B71	O PCIE	AC coupled off Module		Connect AC Coupling Capacitors 0.1uF to Device	DDI 1 Pair 0 differential pairs/Serial Digital Video B red output differential pair
DDI1_PAIR0-/DPO_LANE0-	B72				Connect AC Coupling Capacitors 0.1uF to Device	
DDI1_PAIR1+/DPO_LANE1+	B73	O PCIE	AC coupled off Module		Connect AC Coupling Capacitors 0.1uF to Device	DDI 1 Pair 1 differential pairs/Serial Digital Video B green output differential pair
DDI1_PAIR1-/DPO_LANE1-	B74				Connect AC Coupling Capacitors 0.1uF to Device	
DDI1_PAIR2+/DPO_LANE2+	B75	O PCIE	AC coupled off Module		Connect AC Coupling Capacitors 0.1uF to Device	DDI 1 Pair 2 differential pairs/Serial Digital Video B blue output differential pair
DDI1_PAIR2-/DPO_LANE2-	B76				Connect AC Coupling Capacitors 0.1uF to Device	
DDI1_PAIR3+/DPO_LANE3+	B81	O PCIE	AC coupled off Module		Connect AC Coupling Capacitors 0.1uF to Device	DDI 1 Pair 3 differential pairs/Serial Digital Video B clock output differential pair.
DDI1_PAIR3-/DPO_LANE3-	B82				Connect AC Coupling Capacitors 0.1uF to Device	
DDI1_PAIR4+	B77			NA	NA	NA for CD9A3
DDI1_PAIR4-	B78			NA	NA	
DDI1_PAIR5+	B91			NA	NA	NA for CD9A3
DDI1_PAIR5-	B92			NA	NA	
DDI1_PAIR6+	B93			NA	NA	NA for CD9A3
DDI1_PAIR6-	B94			NA	NA	
DDI1_CTRLCLK_AUX+/DPO_AUX+	B98	I/O PCIE	AC coupled on Module	PD 49.9K to GND (S/W IC between Rpu/PCH)	Connect to DP AUX+	DP AUX+ function if DDI1_DDC_AUX_SEL is no connect
		I/O OD CMOS	3.3V / 3.3V	PU 2.2K to 3.3V, PD 49.9K to GND	Connect to HDMI/DVI I2C CTRLCLK	HDMI/DVI I2C CTRLCLK if DDI1_DDC_AUX_SEL is pulled high
DDI1_CTRLCLK_AUX-/DPO_AUX-	B99	I/O PCIE	AC coupled on Module	PU 100K to 3.3V	Connect to DP AUX-	DP AUX- function if DDI1_DDC_AUX_SEL is no connect
		I/O OD CMOS	3.3V / 3.3V	PU 2.2K to 3.3V/PU 100K to 3.3V	Connect to HDMI/DVI I2C CTRLDATA	HDMI/DVI I2C CTRLDATA if DDI1_DDC_AUX_SEL is pulled high
DDI1_HPD/DPO_HPD	B89	I CMOS	3.3V / 3.3V	PD 1M to GND	PD 1M and Connect to device Hot Plug Detect	DDI Hot-Plug Detect
						Selects the function of DDI1_CTRLCLK_AUX+ and DDI1_CTRLDATA_AUX-. This pin shall have a 1M pull-down to logic ground on the Module. If this input is floating the AUX pair is used for the DP AUX+/- signals. If pulled-high the AUX pair contains the CTRLCLK and CTRLDATA signals***** DDI[n]_DDC_AUX_SEL shall be pulled to 3.3V on the Carrier with a 100K Ohm resistor to configure the DDI[n]_AUX pair as the DDC channel. Carrier DDI[n]_DDC_AUX_SEL should be connected to pin 13 of the DisplayPort
DDI1_DDC_AUX_SEL	B95	I CMOS	3.3V / 3.3V	PD 1M to GND	PU 100K to 3.3V for DDC(HDMI/DVI)	

USB Signals Descriptions						
Signal	Pin#	Pin Type	Pwr Rail /Tolerance	CD9A3 Series	Carrier Board	Description
USB0+	A46	I/O USB	3.3V Suspend/3.3V		Connect 90Ω @100MHz Common Choke in series and ESD suppressors to GND to USB connector	USB differential pairs 0
USB0-	A45					
USB1+	B46	I/O USB	3.3V Suspend/3.3V		Connect 90Ω @100MHz Common Choke in series and ESD suppressors to GND to USB connector	USB differential pairs 1
USB1-	B45					
USB2+	A43	I/O USB	3.3V Suspend/3.3V		Connect 90Ω @100MHz Common Choke in series and ESD suppressors to GND to USB connector	USB differential pairs 2
USB2-	A42					
USB3+	B43	I/O USB	3.3V Suspend/3.3V		Connect 90Ω @100MHz Common Choke in series and ESD suppressors to GND to USB connector	USB differential pairs 3
USB3-	B42					
USB4+	A40	I/O USB	3.3V Suspend/3.3V		Connect 90Ω @100MHz Common Choke in series and ESD suppressors to GND to USB connector	USB differential pairs 4
USB4-	A39					
USB5+	B40	I/O USB	3.3V Suspend/3.3V		Connect 90Ω @100MHz Common Choke in series and ESD suppressors to GND to USB connector	USB differential pairs 5
USB5-	B39					
USB6+	A37	I/O USB	3.3V Suspend/3.3V		Connect 90Ω @100MHz Common Choke in series and ESD suppressors to GND to USB connector	USB differential pairs 6
USB6-	A36					
USB7+	B37	I/O USB	3.3V Suspend/3.3V		Connect 90Ω @100MHz Common Choke in series and ESD suppressors to GND to USB connector	USB differential pairs 7, USB7 may be configured as a USB client or as a host, or both, at the Module designer's discretion.
USB7-	B36					

USB Signals Descriptions						
Signal	Pin#	Pin Type	Pwr Rail /Tolerance	CD9A3 Series	Carrier Board	Description
USB_0_1_OC#	B44	I CMOS	3.3V Suspend/3.3V	PU 10k to 3.3VSB	Connect to Overcurrent of USB Power Switch	USB over-current sense, USB channels 0 and 1. A pull-up for this line shall be present on the Module. An open drain driver from a USB current monitor on the Carrier Board may drive this line low. Do not pull this line high on the Carrier Board.
USB_2_3_OC#	A44	I CMOS	3.3V Suspend/3.3V	PU 10k to 3.3VSB	Connect to Overcurrent of USB Power Switch	USB over-current sense, USB channels 2 and 3. A pull-up for this line shall be present on the Module. An open drain driver from a USB current monitor on the Carrier Board may drive this line low. Do not pull this line high on the Carrier Board.
USB_4_5_OC#	B38	I CMOS	3.3V Suspend/3.3V	PU 10k to 3.3VSB	Connect to Overcurrent of USB Power Switch	USB over-current sense, USB channels 4 and 5. A pull-up for this line shall be present on the Module. An open drain driver from a USB current monitor on the Carrier Board may drive this line low. Do not pull this line high on the Carrier Board.
USB_6_7_OC#	A38	I CMOS	3.3V Suspend/3.3V	PU 10k to 3.3VSB	Connect to Overcurrent of USB Power Switch	USB over-current sense, USB channels 6 and 7. A pull-up for this line shall be present on the Module. An open drain driver from a USB current monitor on the Carrier Board may drive this line low. Do not pull this line high on the Carrier Board.
USB_SSTX0+	D4	O PCIE	AC coupled on Module	NA	NA	Additional transmit signal differential pairs for the SuperSpeed USB data path.(NA for CD9A3)
USB_SSTX0-	D3			NA	NA	
USB_SSRX0+	C4	I PCIE	AC coupled off Modul	NA	NA	Additional receive signal differential pairs for the SuperSpeed USB data path.(NA for CD9A3)
USB_SSRX0-	C3			NA	NA	
USB_SSTX1+	D7	O PCIE	AC coupled on Module	NA	NA	Additional transmit signal differential pairs for the SuperSpeed USB data path.(NA for CD9A3)
USB_SSTX1-	D6			NA	NA	
USB_SSRX1+	C7	I PCIE	AC coupled off Modul	NA	NA	Additional receive signal differential pairs for the SuperSpeed USB data path.(NA for CD9A3)
USB_SSRX1-	C6			NA	NA	
USB_HOST_PRSNT	B96	I CMOS	3.3V Suspend/3.3V	NA	NA	Module USB client may detect the presence of a USB host. A high value(NA for CD9A3) indicates that a host is present.

LVDS Signals Descriptions						
Signal	Pin#	Pin Type	Pwr Rail /Tolerance	CD9A3 Series	Carrier Board	Description
LVDS_A0+	A71	O LVDS	LVDS		Connect to LVDS connector	LVDS Channel A differential pairs
LVDS_A0-	A72					
LVDS_A1+	A73	O LVDS	LVDS		Connect to LVDS connector	
LVDS_A1-	A74					
LVDS_A2+	A75	O LVDS	LVDS		Connect to LVDS connector	
LVDS_A2-	A76					
LVDS_A3+	A78	O LVDS	LVDS		Connect to LVDS connector	
LVDS_A3-	A79					
LVDS_A_CK+	A81	O LVDS	LVDS		Connect to LVDS connector	LVDS Channel A differential clock
LVDS_A_CK-	A82					
LVDS_VDD_EN	A77	O CMOS	3.3V / 3.3V	PD 100K to GND	Connect to enable control of LVDS panel power circuit	LVDS panel power enable
LVDS_BKLT_EN	B79	O CMOS	3.3V / 3.3V	PD 100K to GND	Connect to enable control of LVDS panel backlight power circuit.	LVDS panel backlight enable
LVDS_BKLT_CTRL	B83	O CMOS	3.3V / 3.3V	PD 100K to GND	Connect to brightness control of LVDS panel backlight power circuit.	LVDS panel backlight brightness control
LVDS_I2C_CK	A83	I/O OD CMOS	3.3V / 3.3V	PU 2.2K to 3.3V	Connect to DDC clock of LVDS panel	I2C clock output for LVDS display use
LVDS_I2C_DAT	A84	I/O OD CMOS	3.3V / 3.3V	PU 2.2K to 3.3V	Connect to DDC data of LVDS panel	I2C data line for LVDS display use

LPC Signals Descriptions						
Signal	Pin#	Pin Type	Pwr Rail /Tolerance	CD9A3 Series	Carrier Board	Description
LPC_ADO	B4	I/O CMOS	3.3V / 3.3V		Connect to LPC device	LPC multiplexed address, command and data bus
LPC_AD1	B5					
LPC_AD2	B6					
LPC_AD3	B7					
LPC_FRAME#	B3					
LPC_DREQ#	B8					
LPC_DREQ1#	B9					
LPC_SERIRQ	A50	I/O CMOS	3.3V / 3.3V	PU 10K to 3.3V		LPC serial interrupt
LPC_CLK	B10	O CMOS	3.3V / 3.3V			LPC clock output - 33MHz nominal

SPI Signals Descriptions						
Signal	Pin#	Pin Type	Pwr Rail /Tolerance	CD9A3 Series	Carrier Board	Description
SPI_CS#	B97	O CMOS	3.3V Suspend/3.3V		Connect a series resistor 33Ω to Carrier Board SPI Device CS# pin	Chip select for Carrier Board SPI - may be sourced from chipset SPI0 or SPI1
SPI_MISO	A92	I CMOS	3.3V Suspend/3.3V		Connect a series resistor 33Ω to Carrier Board SPI Device SO pin	Data in to Module from Carrier SPI
SPI_MOSI	A95	O CMOS	3.3V Suspend/3.3V		Connect a series resistor 33Ω to Carrier Board SPI Device SI pin	Data out from Module to Carrier SPI
SPI_CLK	A94	O CMOS	3.3V Suspend/3.3V		Connect a series resistor 33Ω to Carrier Board SPI Device SCK pin	Clock from Module to Carrier SPI
SPI_POWER	A91	O	3.3V Suspend/3.3V			Power supply for Carrier Board SPI – sourced from Module – nominally 3.3V. The Module shall provide a minimum of 100mA on SPI_POWER. Carriers shall use less than 100mA of SPI_POWER. SPI_POWER shall only be used to power SPI devices on the Carrier
BIOS_DIS0#	A34					Selection straps to determine the BIOS boot device.
BIOS_DIS1#	B88	I CMOS	NA			The Carrier should only float these or pull them low, please refer to COM Express Module Base Specification Revision 2.1 for strapping options of BIOS disable signals.

Serial Interface Signals Descriptions						
Signal	Pin#	Pin Type	Pwr Rail /Tolerance	CD9A3 Series	Carrier Board	Description
SERO_TX	A98	O CMOS	5V / 12V(design 3.3v~5V tolerant)		PD 4.7K	General purpose serial port 0 transmitter
SERO_RX	A99	I CMOS	5V / 12V(design 3.3v~5V tolerant)	PU 47K to 3.3V		General purpose serial port 0 receiver
SER1_TX	A101	O CMOS	5V / 12V(design 3.3v~5V tolerant)		PD 4.7K	General purpose serial port 1 transmitter
SER1_RX	A102	I CMOS	5V / 12V(design 3.3v~5V tolerant)	PU 47K to 3.3V		General purpose serial port 1 receiver

Miscellaneous Signal Descriptions						
Signal	Pin#	Pin Type	Pwr Rail /Tolerance	CD9A3 Series	Carrier Board	Description
I2C_CK	B33	I/O OD CMOS	3.3V Suspend/3.3V	PU 2.2K to 3.3VSB		General purpose I2C port clock output
I2C_DAT	B34	I/O OD CMOS	3.3V Suspend/3.3V	PU 2.2K to 3.3VSB		General purpose I2C port data I/O line
SPKR	B32	O CMOS	3.3V / 3.3V			Output for audio enunciator - the "speaker" in PC-AT systems. This port provides the PC beep signal and is mostly intended for debugging purposes.
WDT	B27	O CMOS	3.3V / 3.3V			Output indicating that a watchdog time-out event has occurred.
FAN_PWNOUT	B101	O OD CMOS	3.3V / 12V			Fan speed control. Uses the Pulse Width Modulation (PWM) technique to control the fan's RPM.
FAN_TACHIN	B102	I OD CMOS	3.3V / 12V			Fan tachometer input for a fan with a two pulse output.
TPM_PP	A96	I CMOS	3.3V / 3.3V			Trusted Platform Module (TPM) Physical Presence pin. Active high. TPM chip has an internal pull down. This signal is used to indicate Physical Presence to the TPM. (NC for CD9A3)

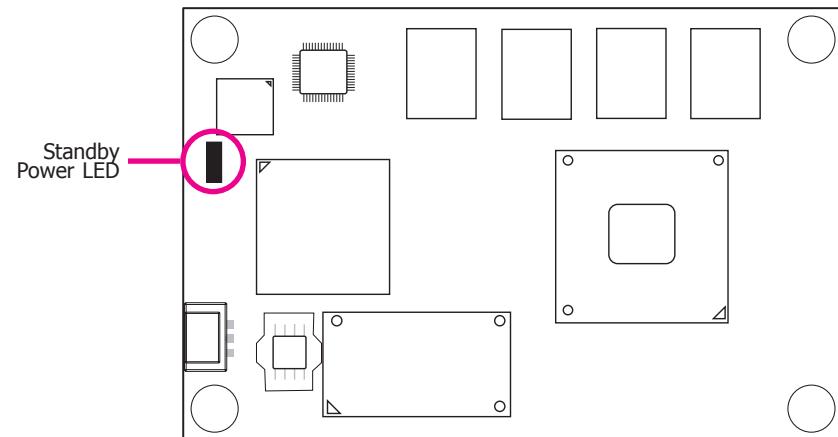
Power and System Management Signals Descriptions						
Signal	Pin#	Pin Type	Pwr Rail /Tolerance	CD9A3 Series	Carrier Board	Description
PWRBTN#	B12	I CMOS	3.3V Suspend/3.3V	PU 10K to 3.3VSB		A falling edge creates a power button event. Power button events can be used to bring a system out of S5 soft off and other suspend states, as well as powering the system down.
SYS_RESET#	B49	I CMOS	3.3V Suspend/3.3V	PU 10K to 3.3VSB		Reset button input. Active low request for Module to reset and reboot. May be falling edge sensitive. For situations when SYS_RESET# is not able to reestablish control of the system, PWR_OK or a power cycle may be used.
CB_RESET#	B50	O CMOS	3.3V Suspend/3.3V			Reset output from Module to Carrier Board. Active low. Issued by Module chipset and may result from a low SYS_RESET# input, a low PWR_OK input, a VCC_12V power input that falls below the minimum specification, a watchdog timeout, or may be initiated by the Module software.
PWR_OK	B24	I CMOS	3.3V / 3.3V	PU 10K to 3.3V		Power OK from main power supply. A high value indicates that the power is good. This signal can be used to hold off Module startup to allow Carrier based FPGAs or other configurable devices time to be programmed.
SUS_STAT#	B18	O CMOS	3.3V Suspend/3.3V			Indicates imminent suspend operation; used to notify LPC devices.
SUS_S3#	A15	O CMOS	3.3V Suspend/3.3V			Indicates system is in Suspend to RAM state. Active low output. An inverted copy of SUS_S3# on the Carrier Board may be used to enable the non-standby power on a typical ATX supply.

Power and System Management Signals Descriptions						
Signal	Pin#	Pin Type	Pwr Rail /Tolerance	CD9A3 Series	Carrier Board	Description
SUS_S4#	A18	O CMOS	3.3V Suspend/3.3V			Indicates system is in Suspend to Disk state. Active low output.
SUS_S5#	A24	O CMOS	3.3V Suspend/3.3V			Indicates system is in Soft Off state.
WAKE0#	B66	I CMOS	3.3V Suspend/3.3V	PU 10K to 3.3VSB		PCI Express wake up signal.
WAKE1#	B67	I CMOS	3.3V Suspend/3.3V	PU 10K to 3.3VSB		General purpose wake up signal. May be used to implement wake-up on PS2 keyboard or mouse activity.
BATLOW#	A27	I CMOS	3.3V Suspend/ 3.3V	PU 10K to 3.3VSB		Indicates that external battery is low. This port provides a battery-low signal to the Module for orderly transitioning to power saving or power cut-off ACPI modes.
LID#	A103	I OD CMOS	3.3V Suspend/12V	PU 10K to 3.3VSB		LID switch. Low active signal used by the ACPI operating system for a LID switch.
SLEEP#	B103	I OD CMOS	3.3V Suspend/12V	PU 10K to 3.3VSB		Sleep button. Low active signal used by the ACPI operating system to bring the system to sleep state or to wake it up again.
THRM#	B35	I CMOS	3.3V / 3.3V	PU 10K to 3.3V		Input from off-Module temp sensor indicating an over-temp situation.
THRMTRIP#	A35	O CMOS	3.3V / 3.3V	PU 10K to 3.3V		Active low output indicating that the CPU has entered thermal shutdown.
SMB_CK	B13	I/O OD CMOS	3.3V Suspend/3.3V	PU 2.2K to 3.3VSB		System Management Bus bidirectional clock line.
SMB_DAT	B14	I/O OD CMOS	3.3V Suspend/3.3V	PU 2.2K to 3.3VSB		System Management Bus bidirectional data line.
SMB_ALERT#	B15	I CMOS	3.3V Suspend/3.3V			System Management Bus Alert – active low input can be used to generate an SMI# (System Management Interrupt) or to wake the system.

GPIO Signals Descriptions						
Signal	Pin#	Pin Type	Pwr Rail /Tolerance	CD9A3 Series	Carrier Board	Description
GPO0	A93	O CMOS	3.3V / 3.3V			General purpose output pins.
GPO1	B54					
GPO2	B57					
GPO3	B63					
GPIO	A54			PU 100K to 3.3V		
GPI1	A63	I CMOS	PU 100K to 3V3	PU 100K to 3.3V		General purpose input pins.
GPI2	A67			PU 100K to 3.3V		
GPI3	A85			PU 100K to 3.3V		

Power and GND Signal Descriptions						
Signal	Pin#	Pin Type	Pwr Rail /Tolerance	CD9A3 Series	Carrier Board	Description
VCC_12V	A104–A109 B104–B109	Power	4.75V – 20.0V	4.75V – 20.0V		Primary power input: +12V nominal. All available VCC_12V pins on the connector(s) shall be used. The module supplies a wide range of power from 4.75V to 20.0V.
VCC_5V_SBY	B84–B87	Power	4.75V - 5.25V	4.75V - 5.25V		Standby power input: +5.0V nominal. If VCC5_SBY is used, all available VCC_5V_SBY pins on the connector(s) shall be used. Only used for standby and suspend functions. May be left unconnected if these functions are not used in the system design.
VCC_RTC	A47	Power	2.0V - 3.3V	2.0V - 3.3V		Real-time clock circuit-power input. Nominally +3.0V.
GND	A1, A11, A21, A31, A41, A51, A57, A60, A66, A70, A80, A90, A100, A110, B1, B11, B21, B31, B41, B51, B60, B70, B80, B90, B100, B110	Power				Ground - DC power and signal and AC signal return path. All available GND connector pins shall be used and tied to Carrier Board GND plane.

Standby Power LED



This LED will light when the system is in the standby mode.

Cooling Option

Heat Sink with Cooling Fan

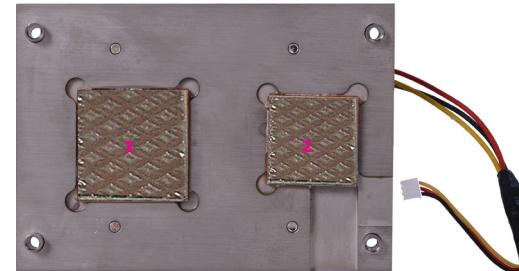


Note:

The system board used in the following illustrations may not resemble the actual board. These illustrations are for reference only.



Top View of the Heat Sink



Bottom View of the Heat Sink

- "1" and "3" denote the locations of the thermal pads designed to contact the corresponding components that are on CD9A3 Series.



Important:

Remove the plastic covering from the thermal pads prior to mounting the heat sink onto CD9A3 Series.

Installing CD9A3 Series onto a Carrier Board

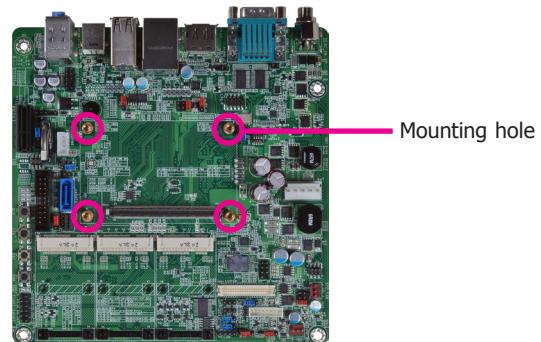


Important:

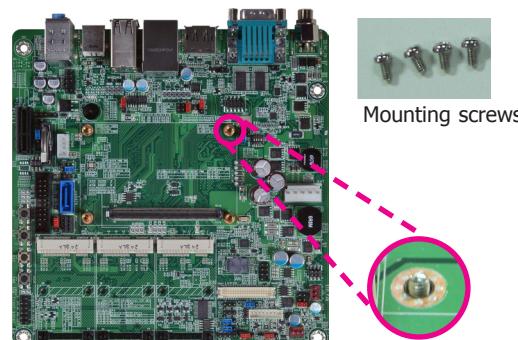
The carrier board (COM100-B) used in this section is for reference purpose only and may not resemble your carrier board. These illustrations are mainly to guide you on how to install CD9A3 Series onto the carrier board of your choice.

• [To download COM100-B datasheet and manual](#)

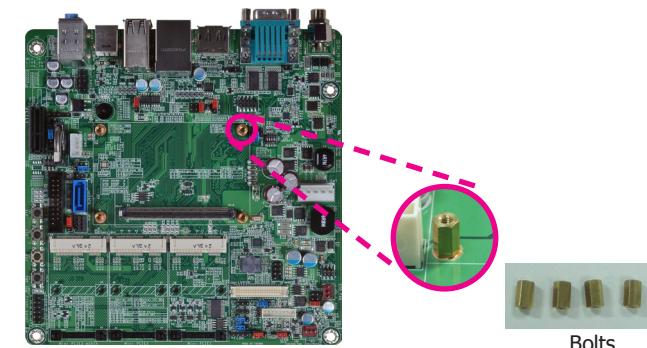
1. Now install the module and heatsink assembly onto the carrier board. The photo below shows the locations of the mounting holes on carrier board.



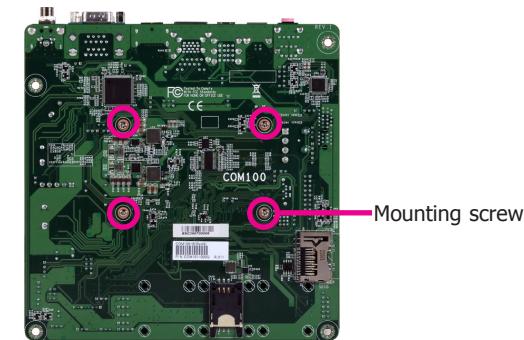
2. Insert the provided mounting screws into the mounting holes - from the bottom through the top of the carrier board.



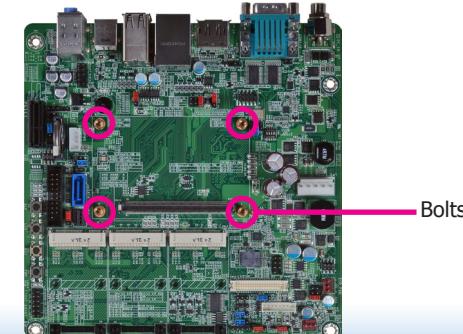
3. While supporting the mounting screw at the bottom, from the top side of the board, fasten a bolt into the screw.



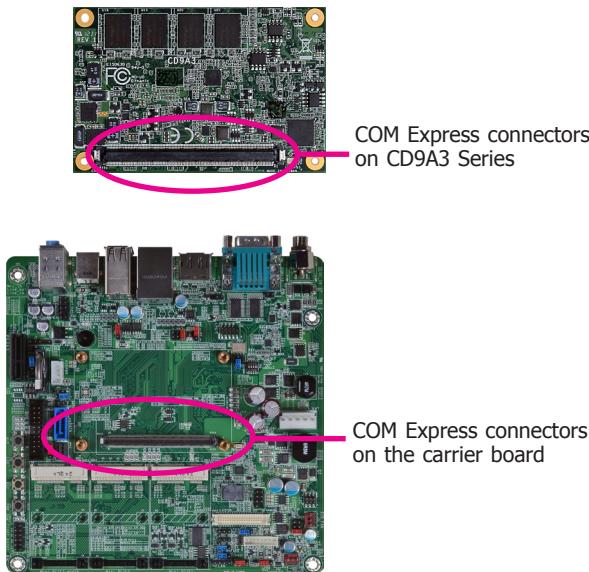
4. The photo below shows the solder side of the board with the screws already fixed in place.



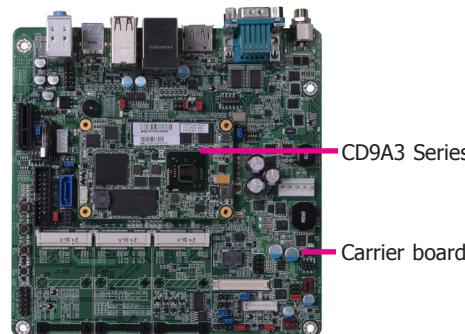
5. The photo below shows the component side of the board with the bolts already fixed in place.



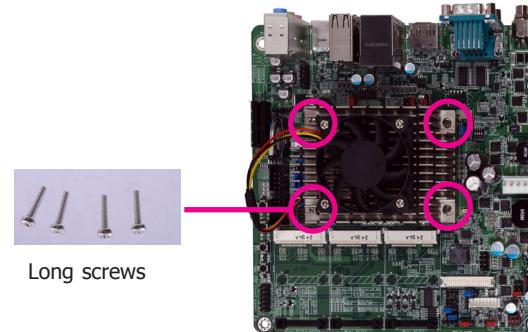
6. Grasping CD9A3 Series by its edges, position it on top of the carrier board with its mounting holes aligned with the bolts on the carrier board. This will also align the COM Express connectors of the two boards to each other.



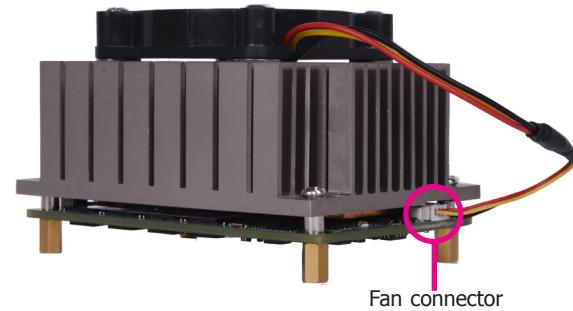
7. Press CD9A3 Series down firmly until it is completely seated on the COM Express connectors of the carrier board.



8. Use the provided mounting screws to secure CD9A3 Series with heat sink to the carrier board and then connect the cooling fan's cable to the fan connector on CD9A3 Series. The photo below shows the locations of the long mounting screws.



9. And then connect the cooling fan's cable to the fan connector on CD9A3 Series.



Chapter 4 - BIOS Setup

Overview

The BIOS is a program that takes care of the basic level of communication between the CPU and peripherals. It contains codes for various advanced features found in this system board. The BIOS allows you to configure the system and save the configuration in a battery-backed CMOS so that the data retains even when the power is off. In general, the information stored in the CMOS RAM of the EEPROM will stay unchanged unless a configuration change has been made such as a hard drive replaced or a device added. It is possible that the CMOS battery will fail causing CMOS data loss. If this happens, you need to install a new CMOS battery and reconfigure the BIOS settings.



Note:

The BIOS is constantly updated to improve the performance of the system board; therefore the BIOS screens in this chapter may not appear the same as the actual one. These screens are for reference purpose only.

Default Configuration

Most of the configuration settings are either predefined according to the Load Optimal Defaults settings which are stored in the BIOS or are automatically detected and configured without requiring any actions. There are a few settings that you may need to change depending on your system configuration.

Entering the BIOS Setup Utility

The BIOS Setup Utility can only be operated from the keyboard and all commands are keyboard commands. The commands are available at the right side of each setup screen.

The BIOS Setup Utility does not require an operating system to run. After you power up the system, the BIOS message appears on the screen and the memory count begins. After the memory test, the message "Press DEL to run setup" will appear on the screen. If the message disappears before you respond, restart the system or press the "Reset" button. You may also restart the system by pressing the <Ctrl> <Alt> and keys simultaneously.

Legends

KEYs	Function
Right and Left Arrows	Moves the highlight left or right to select a menu.
Up and Down Arrows	Moves the highlight up or down between submenus or fields.
<Esc>	Exits to the BIOS setup utility
+ (plus key)	Scrolls forward through the values or options of the highlighted field.
- (minus key)	Scrolls backward through the values or options of the highlighted field.
<F1>	Displays general help
<F2>	Displays previous values
<F3>	Optimized defaults
<F4>	Saves and resets the setup program.
<Enter>	Press <Enter> to enter the highlighted submenu

Scroll Bar

When a scroll bar appears to the right of the setup screen, it indicates that there are more available fields not shown on the screen. Use the up and down arrow keys to scroll through all the available fields.

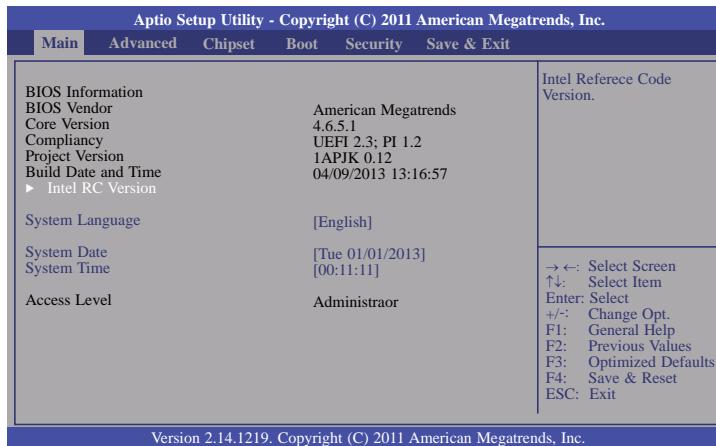
Submenu

When "►" appears on the left of a particular field, it indicates that a submenu which contains additional options are available for that field. To display the submenu, move the highlight to that field and press <Enter>.

AMI BIOS Setup Utility

Main

The Main menu is the first screen that you will see when you enter the BIOS Setup Utility.



Intel RC Version

This section displays Intel Reference Code Version.

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.	
Advanced	
Intel RC Version	
INTEL CEDARVIEN	0.9.0-1
INTEL MRC	1.00
INTEL NM10	1.6.0
INTEL P-UINT	012
INTEL IGFX VBIOS	1071
INTEL ACPI	0.9.0-1
INTEL IFFS	N/A
→ ←: Select Screen ↑ ↓: Select Item Enter: Select + / -: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit	
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.	

System Date

The date format is <day>, <month>, <date>, <year>. Day displays a day, from Sunday to Saturday. Month displays the month, from January to December. Date displays the date, from 1 to 31. Year displays the year, from 1980 to 2099.

System Time

The time format is <hour>, <minute>, <second>. The time is based on the 24-hour military-time clock. For example, 1 p.m. is 13:00:00. Hour displays hours from 00 to 23. Minute displays minutes from 00 to 59. Second displays seconds from 00 to 59.

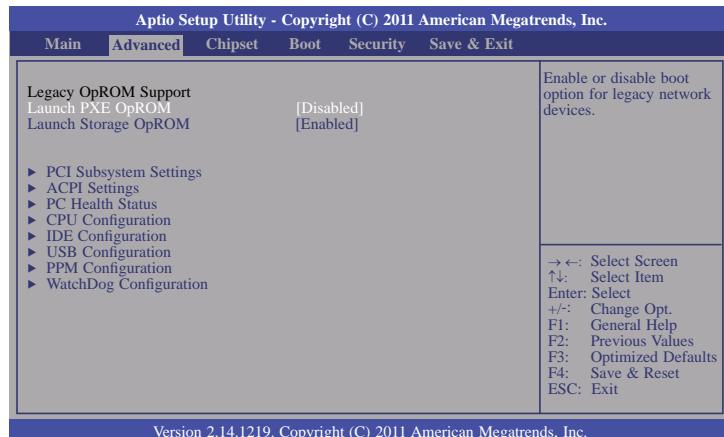
Advanced

The Advanced menu allows you to configure your system for basic operation. Some entries are defaults required by the system board, while others, if enabled, will improve the performance of your system or let you set some features according to your preference.



Important:

Setting incorrect field values may cause the system to malfunction.



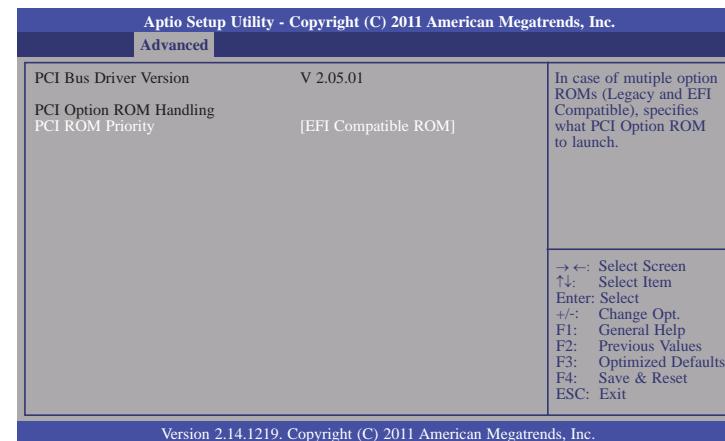
Version 2.14.1219, Copyright (C) 2011 American Megatrends, Inc.

Launch Storage OpROM

Enable or disable boot option for legacy mass storage devices with Option ROM.

PCI Subsystem Settings

This section configures PCI subsystem settings.

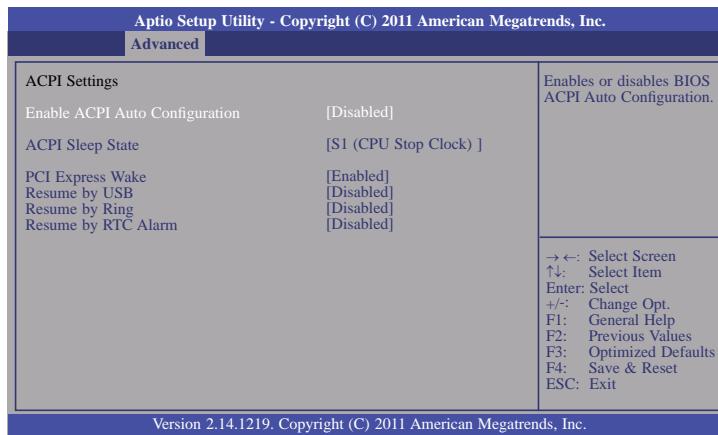


Version 2.14.1219, Copyright (C) 2011 American Megatrends, Inc.

→ ←: Select Screen
↑ ↓: Select Item
Enter: Select
+ / -: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Reset
ESC: Exit

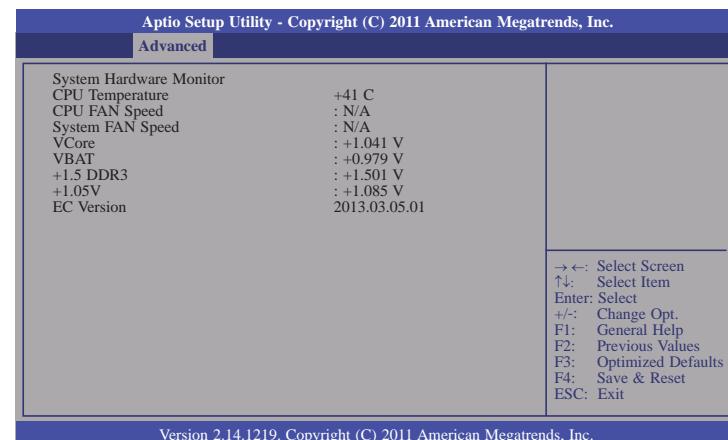
ACPI Settings

This section is used to configure the ACPI Settings.



PC Health Status

This section displays hardware health monitor.



ACPI Sleep State

Selects the highest ACPI sleep state the system will enter when the Suspend button is pressed.

S1(POS) Enables the Power On Suspend function.

S3(STR) Enables the Suspend to RAM function.

PCI Express Wake

Enable resume by PCI Express.

Resume by USB

When Enabled, this system uses the USB signal to carry out a wakeup event.

Resume by Ring

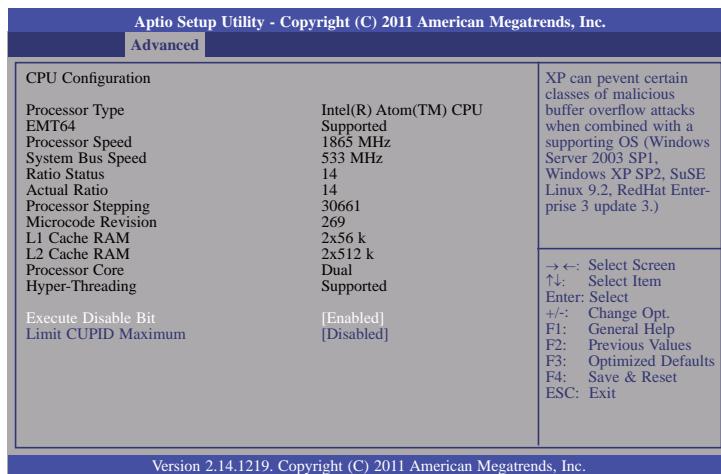
Enable this field to use the Ring signal to wake up the system.

Resume by RTC Alarm

When Enabled, the system uses the RTC to generate a wakeup event.

CPU Configuration

This section is used to configure the CPU. It will also display the detected CPU information.



Hyper-threading

Enable this field for Windows XP and Linux which are optimized for Hyper-Threading technology. Select disabled for other OSes not optimized for Hyper-Threading technology. When disabled, only one thread per enabled core is enabled.

Execute Disable Bit

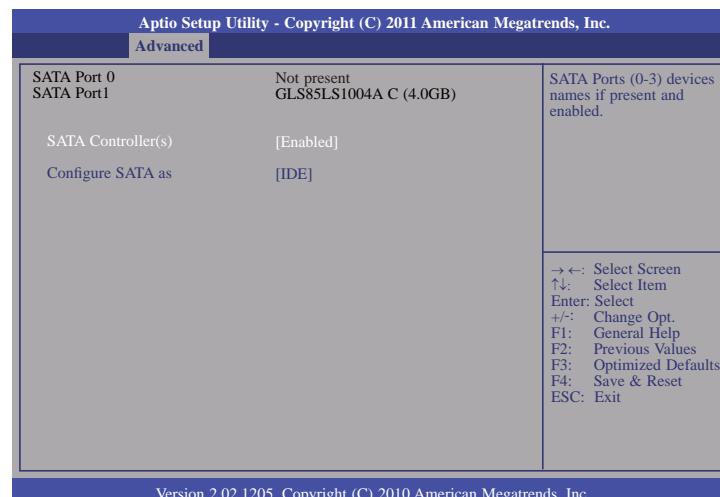
XD can prevent certain classes of malicious buffer overflow attacks when combined with a supporting OS (Windows server 2003 SP1, Windows XP SP2, SuSE Linux 9.2 RedHat Enterprise 3 Update 3.)

Limit CUPID Maximum

The CPUID instruction of some newer CPUs will return a value greater than 3. The default is Disabled because this problem does not exist in the Windows series operating systems. If you are using an operating system other than Windows, this problem may occur. To avoid this problem, enable this field to limit the return value to 3 or less than 3.

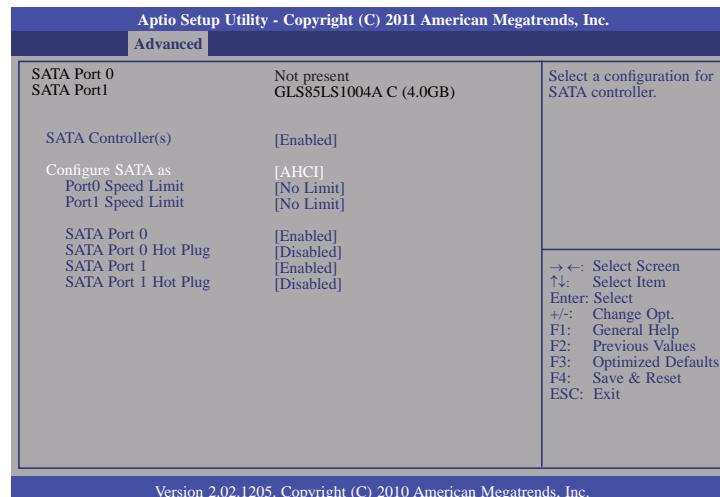
IDE Configuration

This section is used to configure IDE functions.



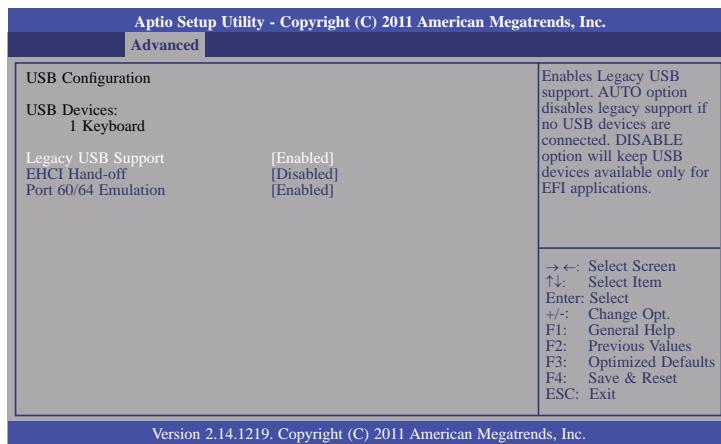
Configure SATA as

This field is used to select a configuration for SATA controller.



USB Configuration

This section is used to configure USB parameters.



Legacy USB Support

Enabled

Enables legacy USB.

Auto

Disables support for legacy when no USB devices are connected.

Disabled

Keeps USB devices available only for EFI applications.

EHCI Hand-off

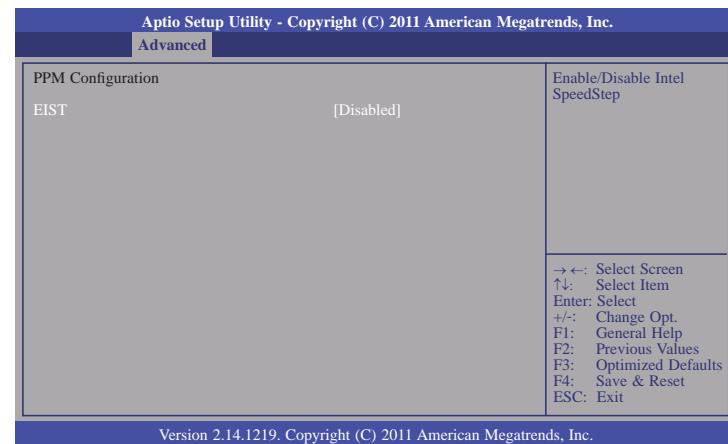
This is a workaround for OSes that does not support EHCI hand-off. The EHCI ownership change should be claimed by the EHCI driver.

Port 60/64 Emulation

Enables I/O port 60h/64h emulation support. This should be enabled for the complete keyboard legacy support for non-USB aware OSes.

PPM Configuration

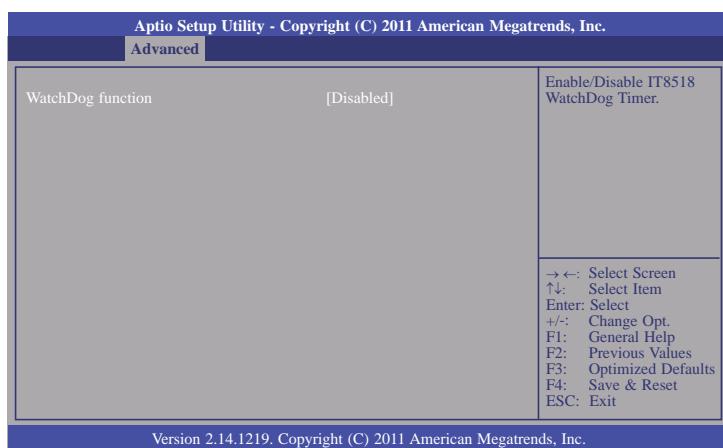
This section is used to configure PPM parameters.



EIST

This field is used to enable or disable the Intel Enhanced SpeedStep Technology.

WatchDog Configuration

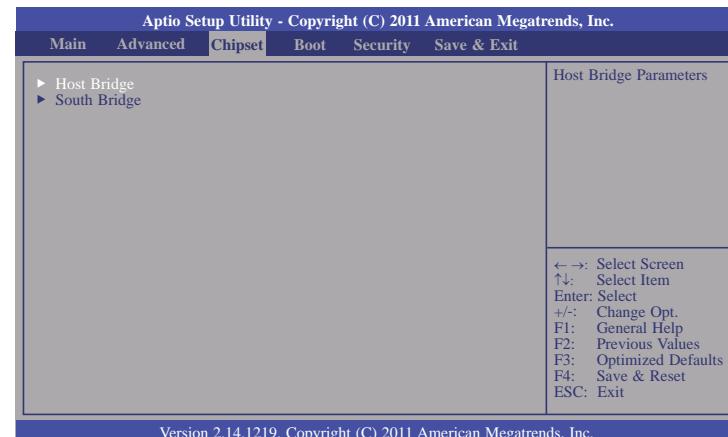


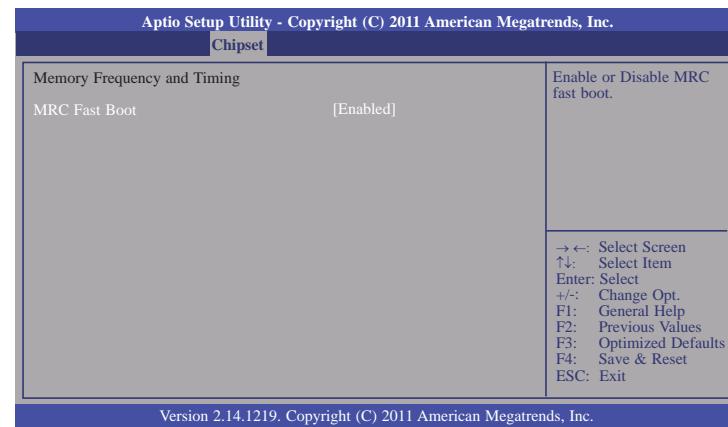
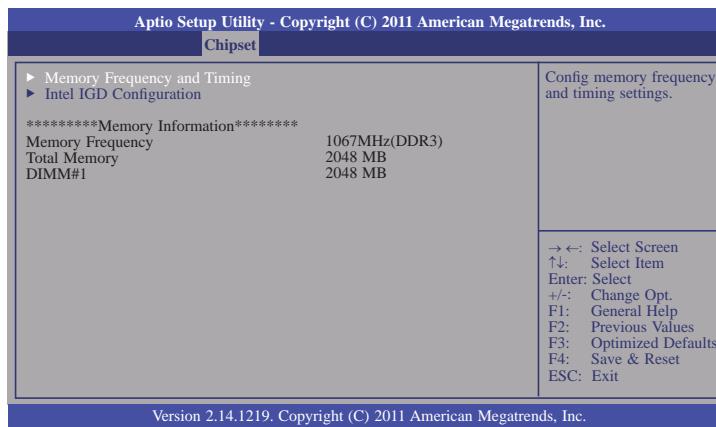
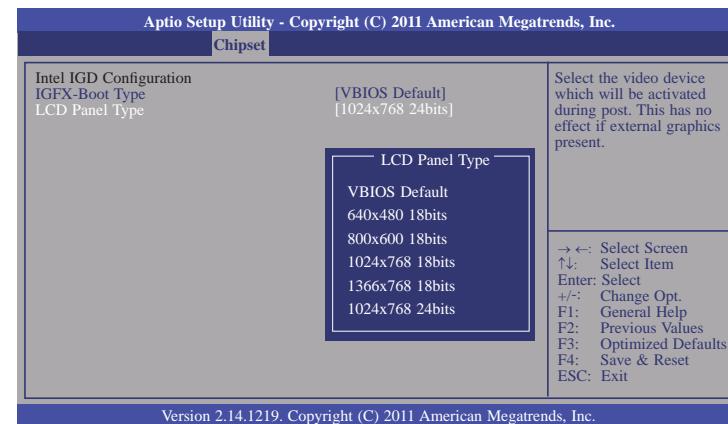
WatchDog function

This field is used to enable or disable the Watchdog timer function.

Chipset

Configures relevant chipset functions.

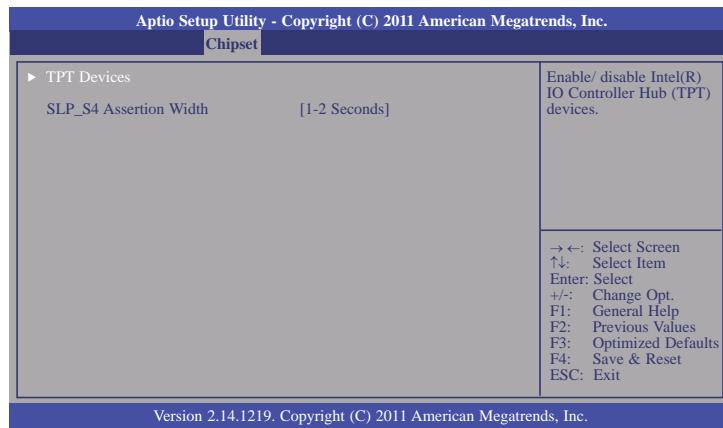
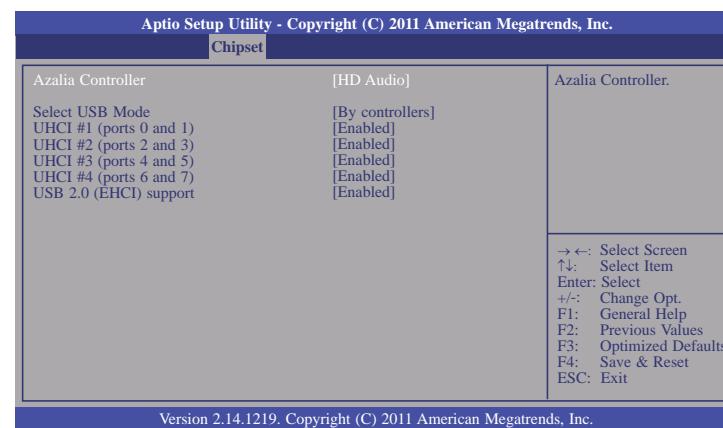


Host Bridge**Memory Frequency and Timing****Intel IGD Configuration****IGFX-Boot Type**

This field is used to select the video device.

LCD Panel Type

This field is used to select LCD panel used by internal graphics device via selecting the appropriate setup time.

South Bridge**TPT Devices****SLP_S4 Assertion Width**

Select a minimum assertion width of SLP_S4# signal.

Select USB Mode

By controllers or ports.

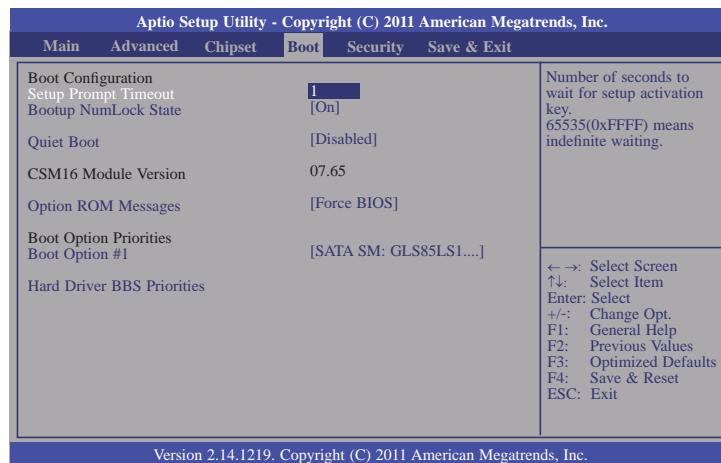
UHCI #1~4

Control the USB UHCI (USB1.1) functions. Disable from highest to lowest controller.

USB 2.0 (EHCI)

Enable or disable USB 2.0 (EHCI) support.

Boot



Setup Prompt Timeout

Selects the number of seconds to wait for the setup activation key. 65535(0xFFFF) denotes indefinite waiting.

Bootup NumLock State

This allows you to determine the default state of the numeric keypad. By default, the system boots up with NumLock on wherein the function of the numeric keypad is the number keys. When set to Off, the function of the numeric keypad is the arrow keys.

Quiet Boot

Enables or disables the quiet boot function.

Option ROM Messages

Set display mode for option ROM.

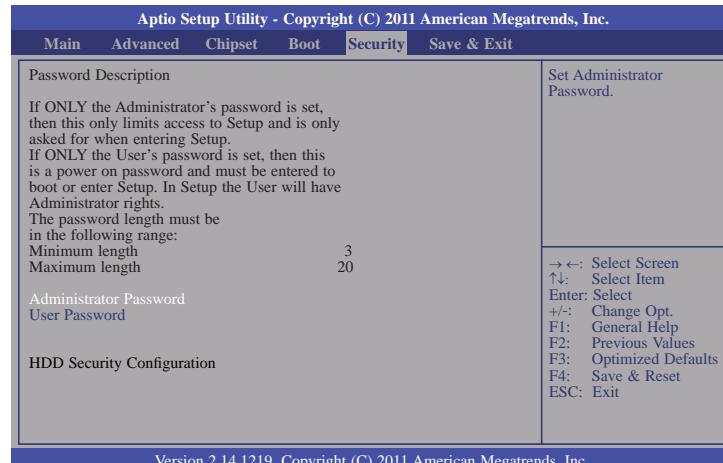
Boot Option #1

Set the system boot order.

Hard Driver BBS Priorities

Set the order of the legacy devices in this group.

Security



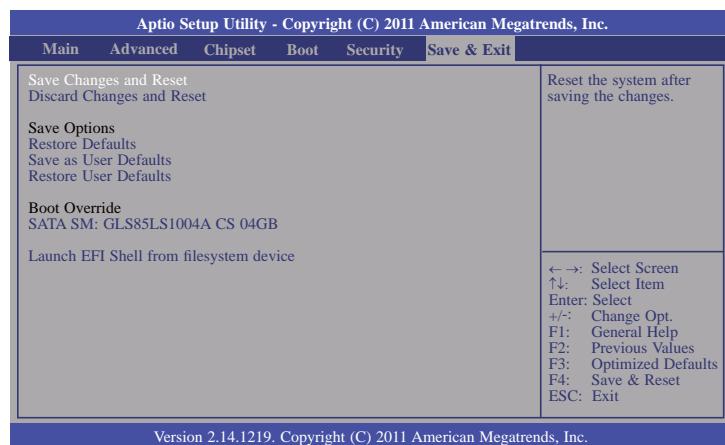
Administrator Password

Sets the administrator password.

User Password

Sets the user password.

Save & Exit



Save Changes and Reset

To save the changes, select this field and then press <Enter>. A dialog box will appear. Select Yes to reset the system after saving all changes made.

Discard Changes and Reset

To discard the changes, select this field and then press <Enter>. A dialog box will appear. Select Yes to reset the system setup without saving any changes.

Restore Defaults

To restore and load the optimized default values, select this field and then press <Enter>. A dialog box will appear. Select Yes to restore the default values of all the setup options.

Save as User Defaults

To save changes done so far as user default, select this field and then press <Enter>. A dialog box will appear. Select Yes to save values as user default.

Restore User Defaults

To restore user default to all the setup options, select this field and then press <Enter>. A dialog box will appear. Select Yes to restore user default.

Updating the BIOS

To update the BIOS, you will need the new BIOS file and a flash utility, AFUDOS.EXE. Please contact technical support or your sales representative for the files.

To execute the utility, type:

A:> AFUDOS BIOS_File_Name /b /p /n
then press <Enter>.

```
C:\CD9A3\BIOS>afudos~1 cd9a3r34.09a /b /p /n
+-----+
| AMI Firmware Update Utility(APTIO) v2.27
| Copyright (C)2009 American Megatrends Inc. All Rights Reserved.
+-----+
Reading file ..... done
Erasing flash ..... done
Writing flash ..... done
Erasing flash ..... done
Writing NVRAM ..... done
Verifying NVRAM ..... done
Verifying NVRAM ..... done
Erasing BootBlock ..... done
Writing BootBlock ..... done
Verifying BootBlock ..... done
C:\CD9A3\BIOS>
```

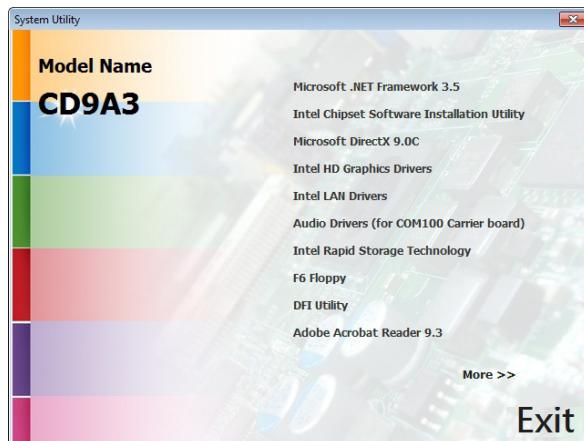
After finishing BIOS update, please turn off the AC power. Wait about 10 seconds and then turn on the AC power again.

Chapter 5 - Supported Software

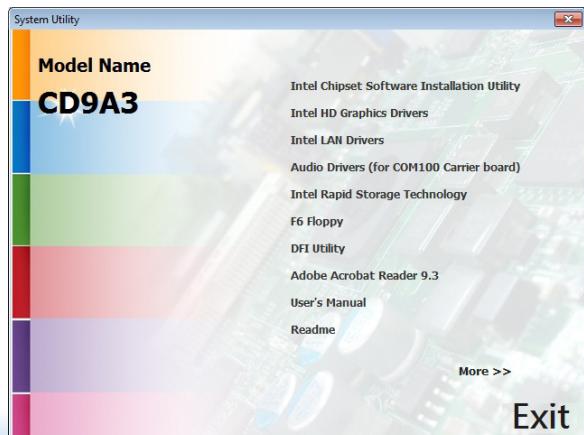
The CD that came with the system board contains drivers, utilities and software applications required to enhance the performance of the system board.

Insert the CD into a CD-ROM drive. The autorun screen (Mainboard Utility CD) will appear. If after inserting the CD, "Autorun" did not automatically start (which is, the Mainboard Utility CD screen did not appear), please go directly to the root directory of the CD and double-click "Setup".

Auto Run Pages (for Windows XP)



Auto Run Pages (for Windows 7)



Microsoft .NET Framework 3.5 (For Windows XP)



Note:

Before installing Microsoft .NET Framework 3.5, make sure you have updated your Windows XP operating system to Service Pack 3.

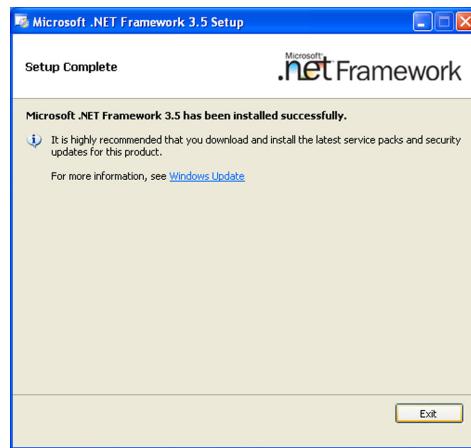
To install the driver, click "Microsoft .NET Framework 3.5" on the main menu.

1. Read the license agreement carefully.

Click "I have read and accept the terms of the License Agreement" then click Install.

2. Setup is now installing the driver.

3. Click Exit.



Intel Chipset Software Installation Utility

The Intel Chipset Software Installation Utility is used for updating Windows INF files so that the Intel chipset can be recognized and configured properly in the system.

To install the utility, click "Intel Chipset Software Installation Utility" on the main menu.

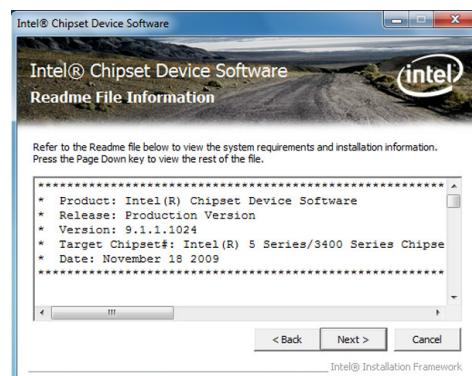
1. Setup is now ready to install the utility. Click Next.



2. Read the license agreement then click Yes.



3. Go through the readme document for system requirements and installation tips then click Next.



4. After completing installation, click Finish to exit setup.



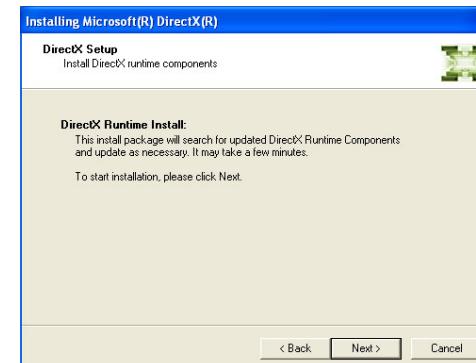
Microsoft DirectX 9.0C (For Windows XP)

To install the utility, click "Microsoft DirectX 9.0C Driver" on the main menu.

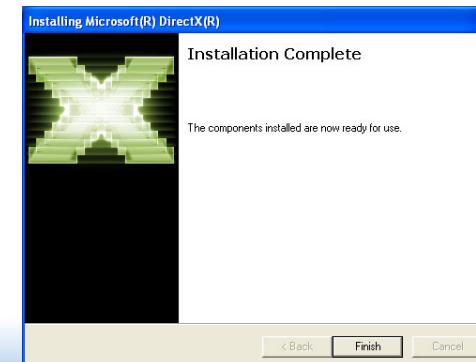
1. Click "I accept the agreement" then click Next.



2. To start installation, click Next.



3. Click Finish. Reboot the system for DirectX to take effect.



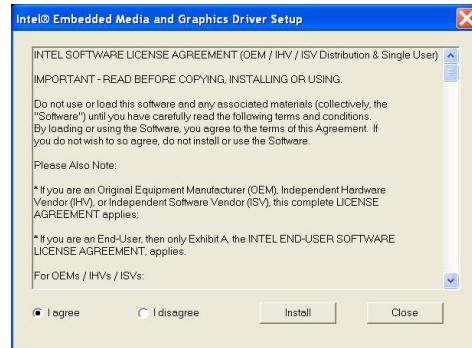
Intel HD Graphics Drivers (For Windows XP)

To install the driver, click "Intel HD Graphics Drivers" on the main menu.

1. Setup is now ready to install the graphics driver. Select "Installs driver and application files" and click Next.



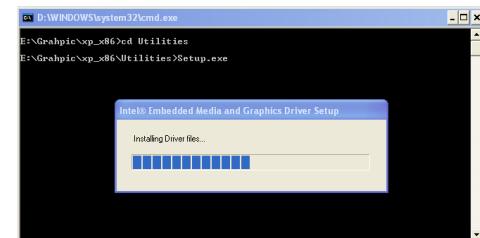
2. Read the license agreement. Then, select "I agree" and click Install.



3. Click "Continue Anyway" to start the installation.



4. Setup is now installing the driver.



5. Click "Yes" to restart this computer now.

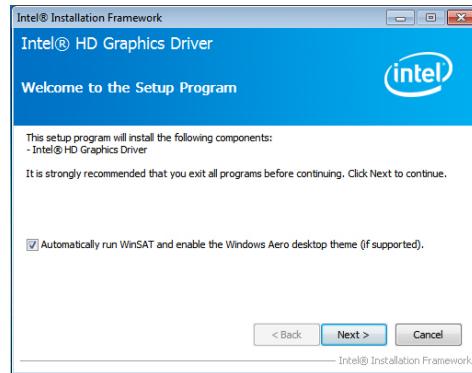
Restarting the system will allow the new software installation to take effect.



Intel HD Graphics Drivers (For Windows 7)

To install the driver, click "Intel HD Graphics Drivers" on the main menu.

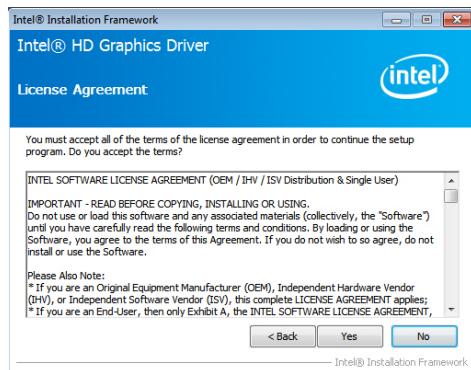
1. Setup is now ready to install the graphics driver. Click Next.



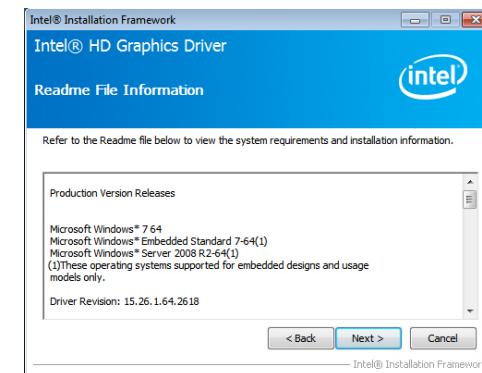
By default, the "Automatically run WinSAT and enable the Windows Aero desktop theme" is enabled. With this enabled, after installing the graphics driver and the system rebooted, the screen will turn blank for 1 to 2 minutes (while WinSAT is running) before the Windows 7/Windows 8 desktop appears. The "blank screen" period is the time Windows is testing the graphics performance.

We recommend that you skip this process by disabling this function then click Next.

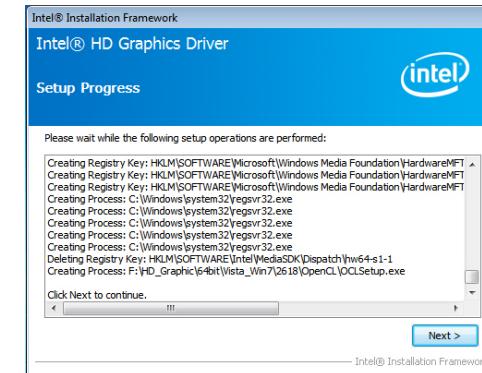
2. Read the license agreement then click Yes.



3. Go through the readme document for system requirements and installation tips then click Next.

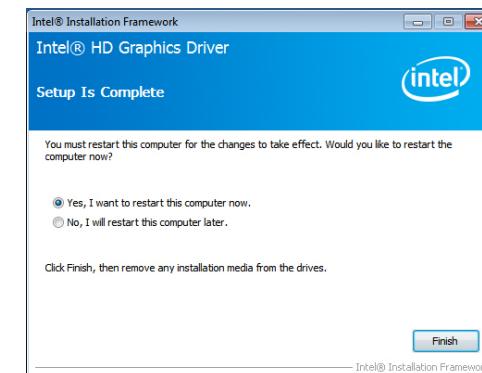


4. Setup is now installing the driver. Click Next to continue.



5. Click "Yes, I want to restart this computer now" then click Finish.

Restarting the system will allow the new software installation to take effect.



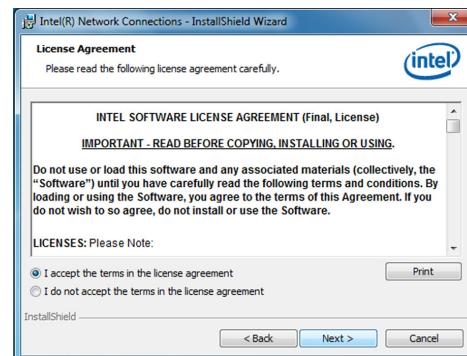
Intel LAN Drivers

To install the driver, click "Intel LAN Drivers" on the main menu.

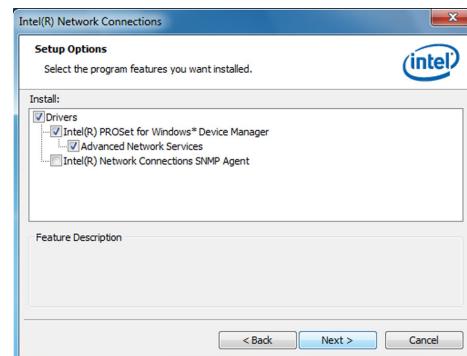
1. Setup is ready to install the driver. Click Next.



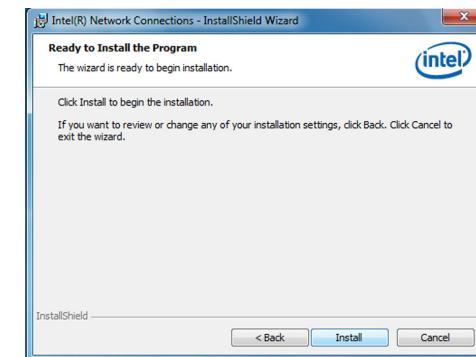
2. Click "I accept the terms in the license agreement" then click "Next".



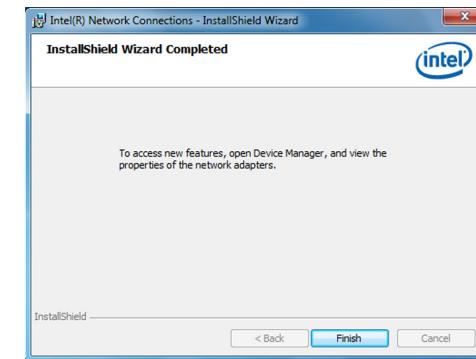
3. Select the program features you want installed then click Next.



4. Click Install to begin the installation.

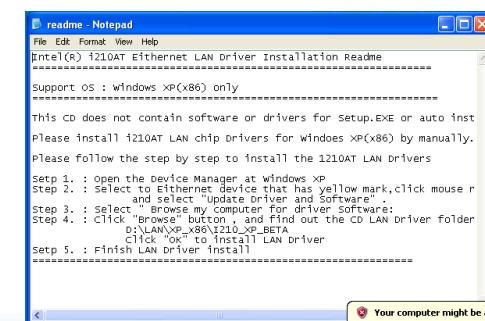


5. After completing installation, click Finish.



Note:
If the CD does not contain the LAN driver for Windows XP, please follow the steps listed below to install the i210AT LAN driver.

Install the i210AT LAN driver for Windows XP by manually.



Audio Drivers (For COM100-B Carrier Board)

To install the driver, click "Audio Drivers (for COM100-B Carrier Board)" on the main menu.

1. Setup is now ready to install the audio driver. Click Next.
2. Follow the remainder of the steps on the screen; clicking "Next" each time you finish a step.



3. Click "Yes, I want to restart my computer now" then click Finish.

Restarting the system will allow the new software installation to take effect.



Note:

The integrated Intel® High-definition Display Audio driver does not support Windows XP. When the Windows XP runs, there will be a warning message with yellow mark on the device manager.

Intel Rapid Storage Technology

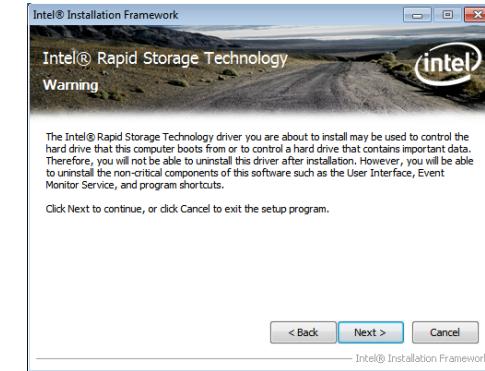
The Intel Rapid Storage Technology is a utility that allows you to monitor the current status of the SATA drives. It enables enhanced performance and power management for the storage subsystem.

To install the driver, click "Intel Rapid Storage Technology" on the main menu.

1. Setup is now ready to install the utility. Click Next.



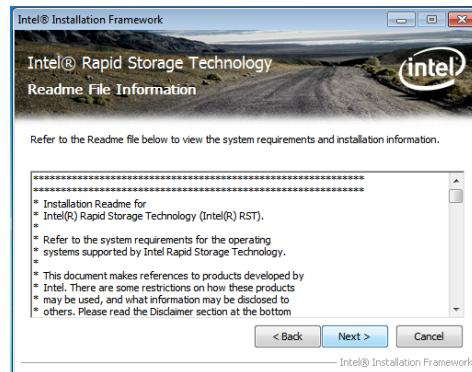
2. Read the warning then click Yes.



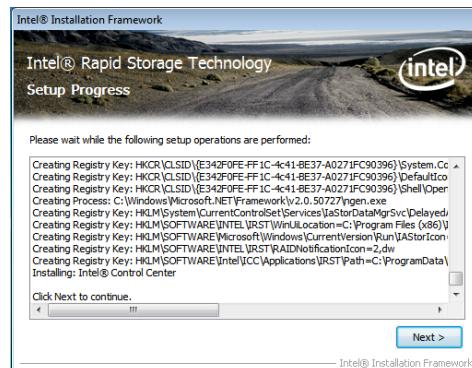
3. Read the license agreement then click Yes.



4. Go through the readme document for system requirements and installation tips then click Next.

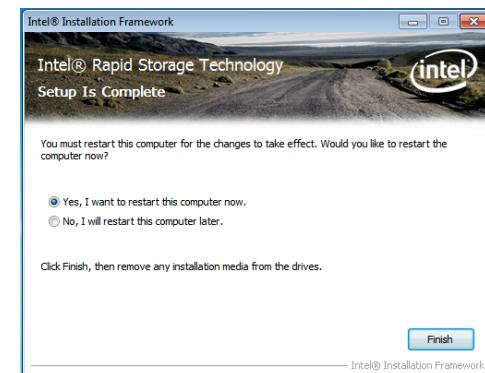


5. Setup is now installing the utility. Click Next to continue.



6. Click "Yes, I want to restart my computer now" then click Finish.

Restarting the system will allow the new software installation to take effect.



7. Run the Intel Matrix Storage Console utility to view the hard drives' configuration.



F6 Floppy

This is used to create a floppy driver diskette needed when you install Windows® XP using the F6 installation method. This will allow you to install the operating system onto a hard drive when in AHCI mode.

1. Insert a blank floppy diskette.
2. Locate for the drivers in the CD then copy them to the floppy diskette. The CD includes drivers for both 32-bit and 64-bit operating systems. The path to the drivers are shown below.

32-bit

CD Drive:\AHCI_RAID\F6FLOPPY\f6flpy32

64-bit

CD Drive:\AHCI_RAID\F6FLOPPY\f6flpy64

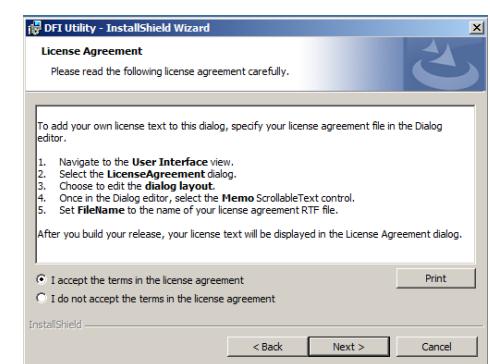
DFI Utility

DFI Utility provides information about the board, HW Health, Watchdog and DIO. To access the utility, click "DFI Utility" on the main menu.

1. Setup is ready to install the DFI Utility driver. Click Next.



2. Click "I accept the terms in the license agreement" and then click Next.



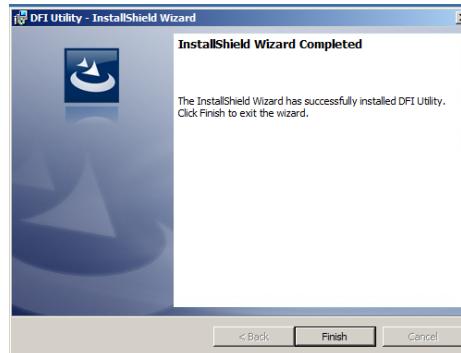
3. Enter “User Name” and “Organization” information and then click Next.



4. Click Install to begin the installation.



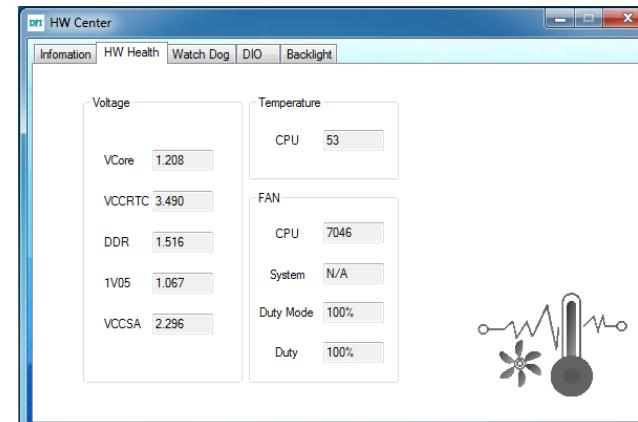
5. After completing installation, click Finish.



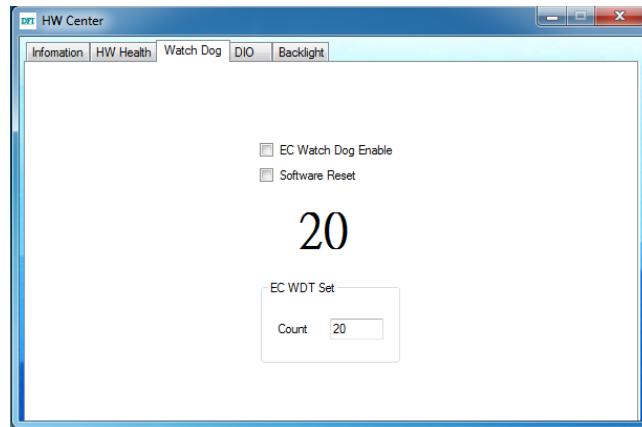
The DFI Utility icon will appear on the desktop. Double-click the icon to open the utility.



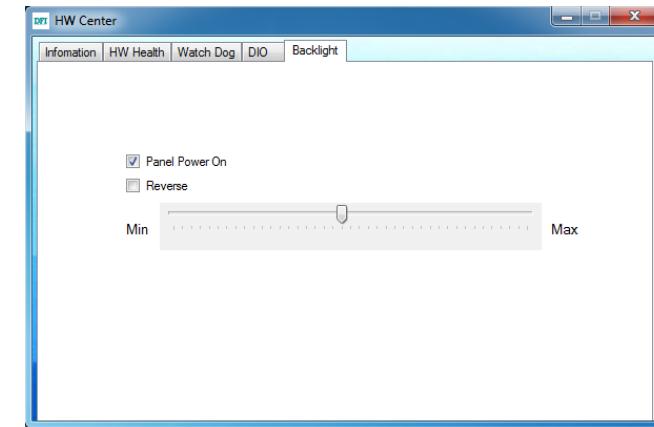
Information



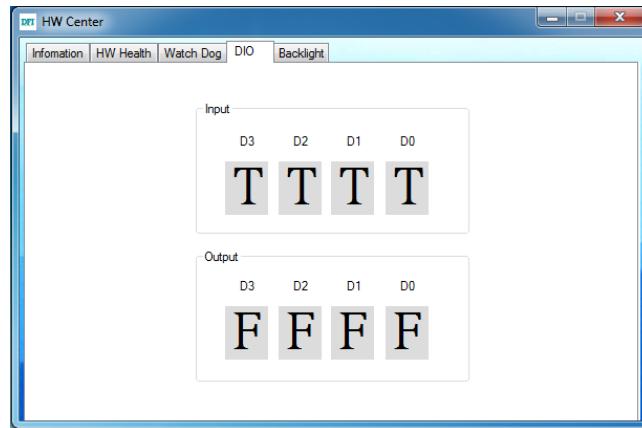
HW Health



WatchDog



Backlight

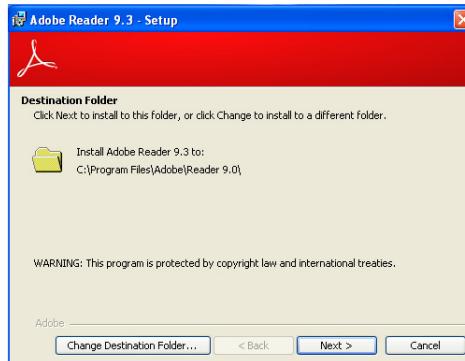


DIO

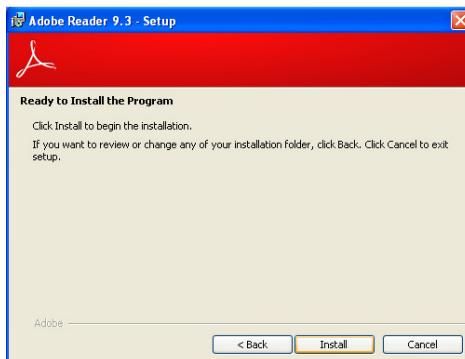
Adobe Acrobat Reader 9.3

To install the reader, click "Adobe Acrobat Reader 9.3" on the main menu.

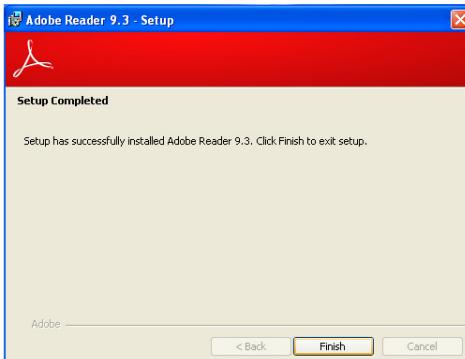
1. Click Next to install or click Change Destination Folder to select another folder.



2. Click Install to begin installation.



3. Click Finish to exit installation.



Appendix A - NLITE and AHCI Installation Guide

nLite

nLite is an application program that allows you to customize your XP installation disc by integrating the RAID/AHCI drivers into the disc. By using nLite, the F6 function key usually required during installation is no longer needed.


Note:

The installation steps below are based on nLite version 1.4.9. Installation procedures may slightly vary if you're using another version of the program.

1. Download the program from nLite's official website.

<http://www.nliteos.com/download.html>

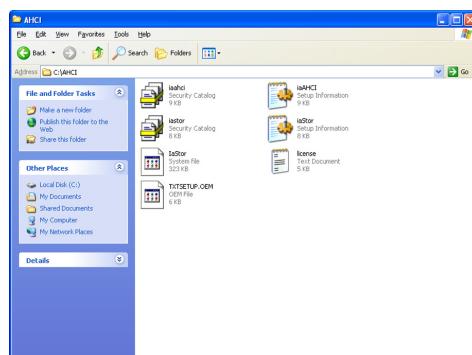
2. Install nLite.


Important:

Due to its coding with Visual.Net, you may need to first install .NET Framework prior to installing nLite.

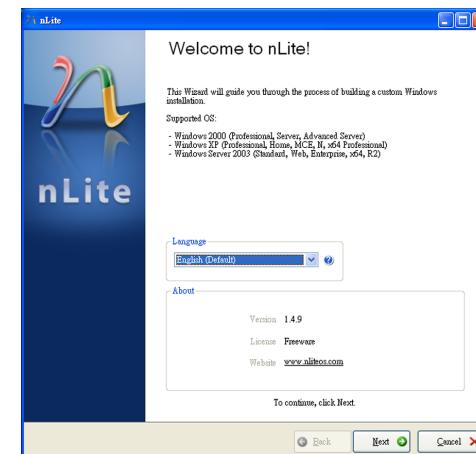
3. Download relevant RAID/AHCI driver files from Intel's website. The drivers you choose will depend on the operating system and chipset used by your computer.

The downloaded driver files should include iaahci.cat, iaAHCI.inf, iastor.cat, iaStor.inf, iaStor.sys, license.txt and TXTSETUP.OEM.



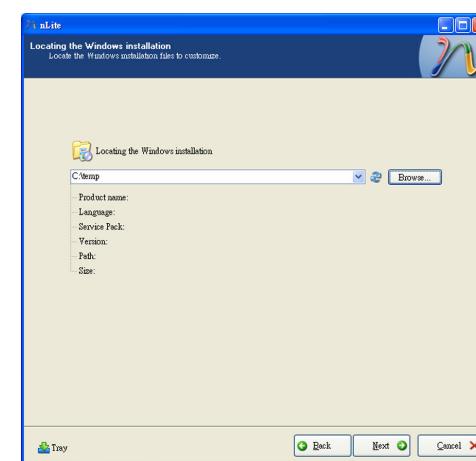
4. Insert the XP installation disc into an optical drive.

5. Launch nLite. The Welcome screen will appear. Click Next.

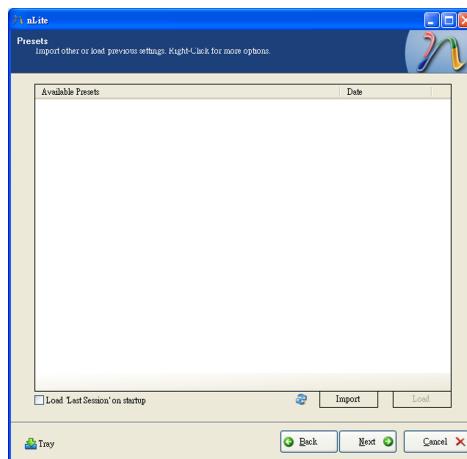


6. Click Next to temporarily save the Windows installation files to the designated default folder.

If you want to save them in another folder, click Browse, select the folder and then click Next.



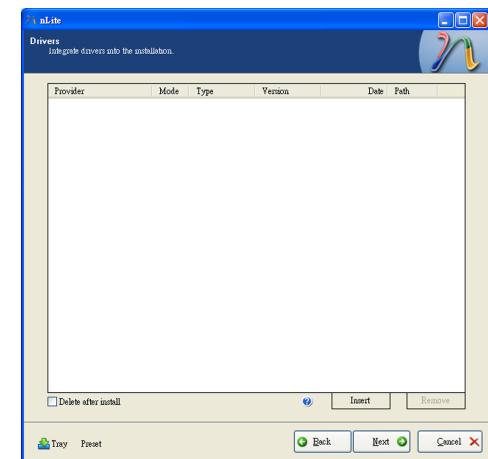
7. Click Next.



8. In the Task Selection dialog box, click Drivers and Bootable ISO. Click Next.

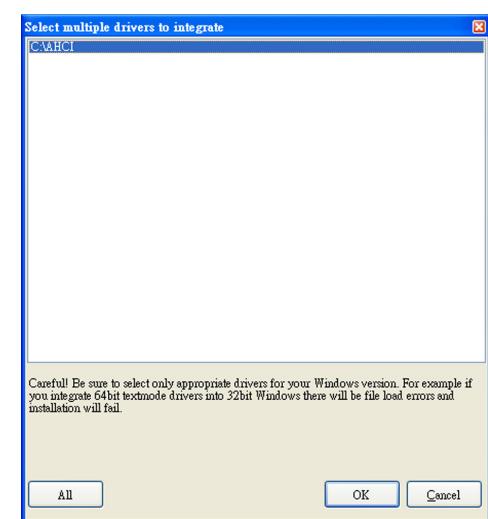


9. Click Insert and then select Multiple driver folder to select the drivers you will integrate. Click Next.

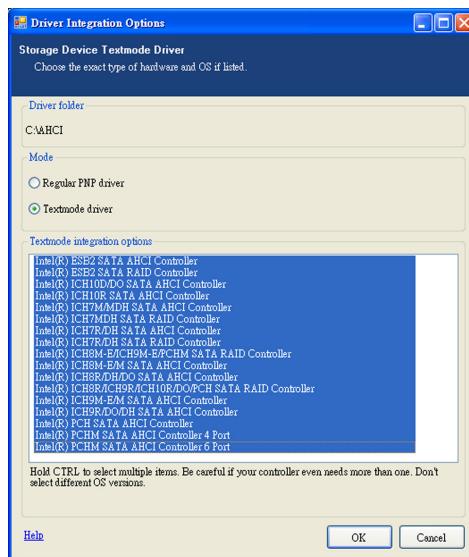


10. Select only the drivers appropriate for the Windows version that you are using and then click OK.

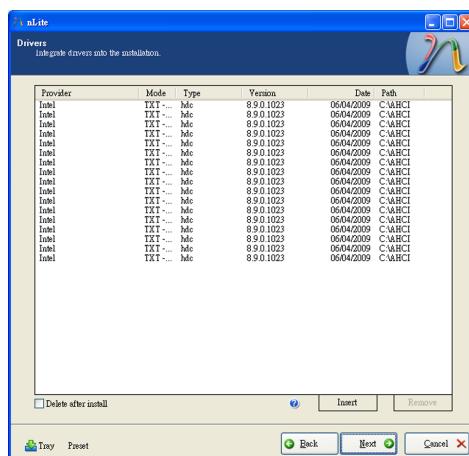
Integrating 64-bit drivers into 32-bit Windows or vice versa will cause file load errors and failed installation.



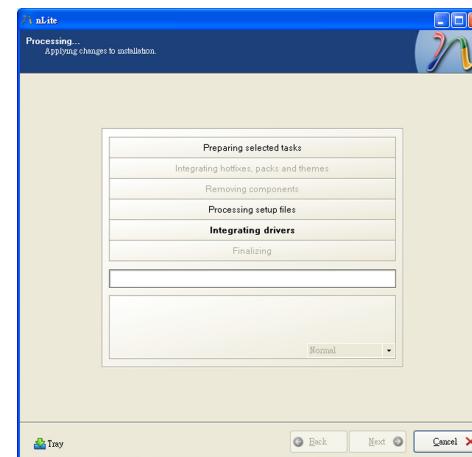
11. If you are uncertain of the southbridge chip used on your motherboard, select all RAID/AHCI controllers and then click OK.



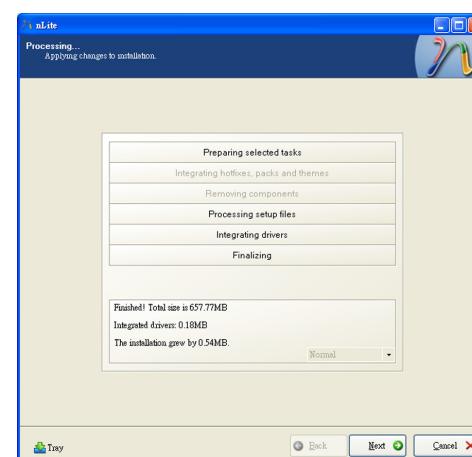
12. Click Next.



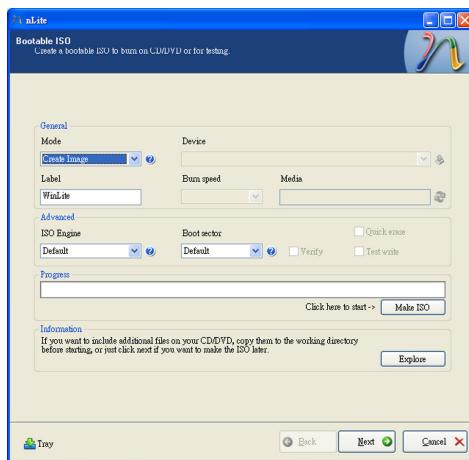
13. The program is currently integrating the drivers and applying changes to the installation.



14. When the program is finished applying the changes, click Next.

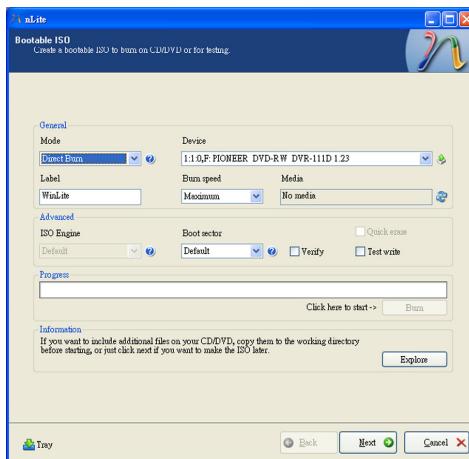


15. To create an image, select the Create Image mode under the General section and then click Next.



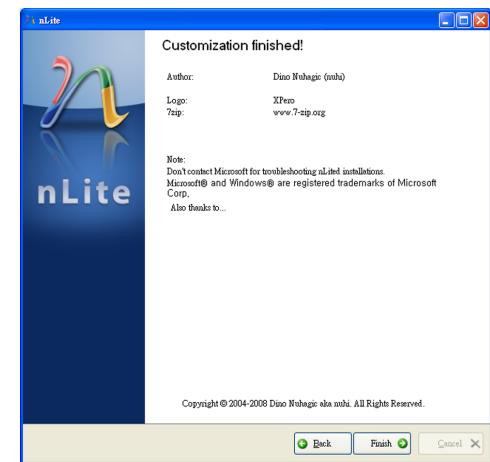
16. Or you can choose to burn it directly to a disc by selecting the Direct Burn mode under the General section.

Select the optical device and all other necessary settings and then click Next.



17. You have finished customizing the Windows XP installation disc. Click Finish.

Enter the BIOS utility to configure the SATA controller to RAID/AHCI. You can now install Windows XP.

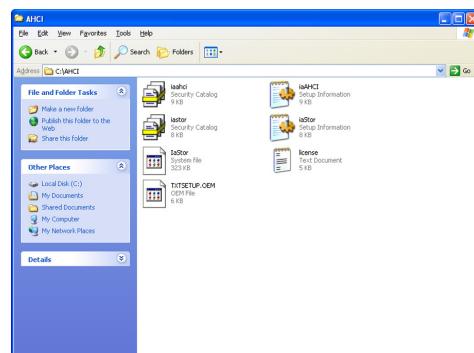


AHCI

The installation steps below will guide you in configuring your SATA drive to AHCI mode.

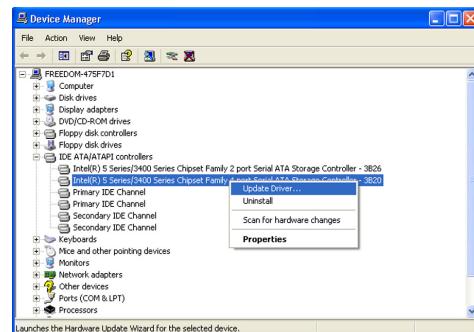
1. Enter the BIOS utility and configure the SATA controller to IDE mode.
2. Install Windows XP but do not press F6.
3. Download relevant RAID/AHCI driver files supported by the motherboard chipset from Intel's website.

Transfer the downloaded driver files to C:\AHCI.



4. Open Device Manager and right click on one of the Intel Serial ATA Storage Controllers, then select Update Driver.

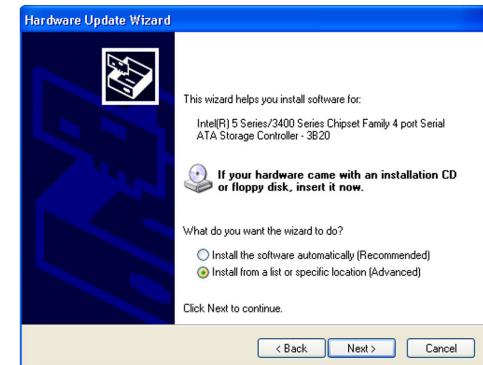
If the controller you selected did not work, try selecting another one.



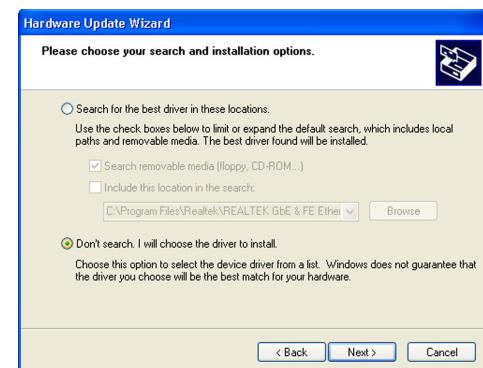
5. In the Hardware Update Wizard dialog box, select "No, not this time" then click Next.



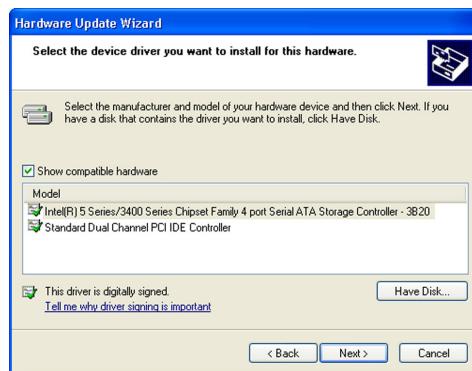
6. Select "Install from a list or specific location (Advanced)" and then click Next.



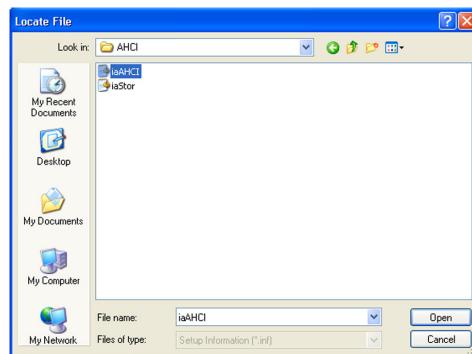
7. Select "Don't search. I will choose the driver to install" and then click Next.



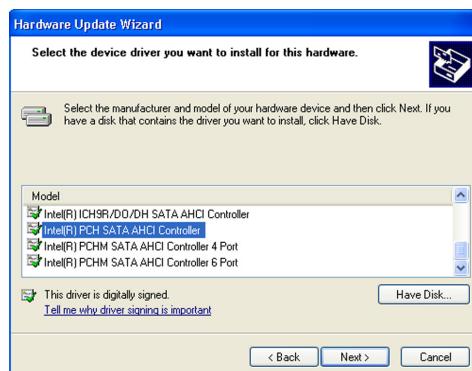
8. Click "Have Disk".



9. Select C:\AHCI\iaAHCI.inf and then click Open.



10. Select the appropriate AHCI Controller of your hardware device and then click Next.



11. A warning message appeared because the selected SATA controller did not match your hardware device.

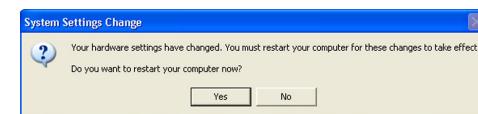
Ignore the warning and click Yes to proceed.



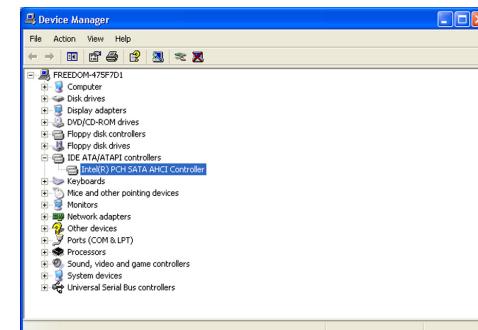
12. Click Finish.



13. The system's settings have been changed. Windows XP requires that you restart the computer. Click Yes.



14. Enter the BIOS utility and modify the SATA controller from IDE to AHCI. By doing so, Windows will work normally with the SATA controller that is in AHCI mode.



Appendix B - Watchdog Sample Code

```

#include <stdio.h>
//-----
#define EC_EnablePort 0x66
#define EC_DataPort 0x62
//-----
void WriteEC(char,int);
void SetWDTime(int,int);
int GetWDTime(void);
//-----
main()
{
    unsigned int countdown;
    unsigned int input,count_h,count_l;

    printf("Input WD Time: ");
    scanf("%d",&input);
    printf("\n");
    count_h=input>>8;
    count_l=input&0x00FF;
    SetWDTime(count_h,count_l);

    while(1)
    {
        countdown = GetWDTime();
        delay(100);
        printf("\rTime Remaining: %d ",countdown);
    }
}
//-----
void SetWDTime(int count_H,int count_L)
{
    //Set Count
    WriteEC(0xB7,count_H); //High Byte
    WriteEC(0xB8,count_L); //Low Byte
    //Enable Watch Dog Timer
    WriteEC(0xB4,0x02);
}
//-----
int GetWDTime(void)
{
    int sum,data_h,data_l;
    //Select EC Read Type
    outportb(EC_EnablePort,0x80);
    delay(5);
    //Get Remaining Count High Byte
    outportb(EC_DataPort,0xF6);
    delay(5);
    data_h=inportb(EC_DataPort);
    delay(5);
    //Select EC Read Type
    outportb(EC_EnablePort,0x80);
    delay(5);
    //Get Remaining Count Low Byte
    outportb(EC_DataPort,0xF7);
    delay(5);
    data_l=inportb(EC_DataPort);
    delay(5);

    data_h<<=8;
    data_h&=0xFF00;
    sum=data_h|data_l;
    return sum;
}
//-----
void WriteEC(char EC_Addr, int data)
{
    //Select EC Write Type
    outportb(EC_EnablePort,0x81);
    delay(5);
    outportb(EC_DataPort,EC_Addr);
    delay(5);
    outportb(EC_DataPort,data);
    delay(5);
}
//-----

```

Appendix C - System Error Message

When the BIOS encounters an error that requires the user to correct something, either a beep code will sound or a message will be displayed in a box in the middle of the screen and the message, PRESS F1 TO CONTINUE, CTRL-ALT-ESC or DEL TO ENTER SETUP, will be shown in the information box at the bottom. Enter Setup to correct the error.

Error Messages

One or more of the following messages may be displayed if the BIOS detects an error during the POST. This list indicates the error messages for all Awards BIOSes:

CMOS BATTERY HAS FAILED

The CMOS battery is no longer functional. It should be replaced.

**Important:**

Danger of explosion if battery incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the battery manufacturer's instructions.

CMOS CHECKSUM ERROR

Checksum of CMOS is incorrect. This can indicate that CMOS has become corrupt. This error may have been caused by a weak battery. Check the battery and replace if necessary.

DISPLAY SWITCH IS SET INCORRECTLY

The display switch on the motherboard can be set to either monochrome or color. This indicates the switch is set to a different setting than indicated in Setup. Determine which setting is correct, either turn off the system and change the jumper or enter Setup and change the VIDEO selection.

Appendix D - Troubleshooting

Troubleshooting Checklist

This chapter of the manual is designed to help you with problems that you may encounter with your personal computer. To efficiently troubleshoot your system, treat each problem individually. This is to ensure an accurate diagnosis of the problem in case a problem has multiple causes.

Some of the most common things to check when you encounter problems while using your system are listed below.

1. The power switch of each peripheral device is turned on.
2. All cables and power cords are tightly connected.
3. The electrical outlet to which your peripheral devices are connected is working. Test the outlet by plugging in a lamp or other electrical device.
4. The monitor is turned on.
5. The display's brightness and contrast controls are adjusted properly.
6. All add-in boards in the expansion slots are seated securely.
7. Any add-in board you have installed is designed for your system and is set up correctly.

Monitor/Display

If the display screen remains dark after the system is turned on:

1. Make sure that the monitor's power switch is on.
2. Check that one end of the monitor's power cord is properly attached to the monitor and the other end is plugged into a working AC outlet. If necessary, try another outlet.
3. Check that the video input cable is properly attached to the monitor and the system's display adapter.
4. Adjust the brightness of the display by turning the monitor's brightness control knob.

The picture seems to be constantly moving.

1. The monitor has lost its vertical sync. Adjust the monitor's vertical sync.
2. Move away any objects, such as another monitor or fan, that may be creating a magnetic field around the display.
3. Make sure your video card's output frequencies are supported by this monitor.

The screen seems to be constantly wavering.

1. If the monitor is close to another monitor, the adjacent monitor may need to be turned off. Fluorescent lights adjacent to the monitor may also cause screen wavering.

Power Supply

When the computer is turned on, nothing happens.

1. Check that one end of the AC power cord is plugged into a live outlet and the other end properly plugged into the back of the system.
2. Make sure that the voltage selection switch on the back panel is set for the correct type of voltage you are using.
3. The power cord may have a "short" or "open". Inspect the cord and install a new one if necessary.

Hard Drive

Hard disk failure.

1. Make sure the correct drive type for the hard disk drive has been entered in the BIOS.
2. If the system is configured with two hard drives, make sure the bootable (first) hard drive is configured as Master and the second hard drive is configured as Slave. The master hard drive must have an active/bootable partition.

Excessively long formatting period.

If your hard drive takes an excessively long period of time to format, it is likely a cable connection problem. However, if your hard drive has a large capacity, it will take a longer time to format.

Serial Port

The serial device (modem, printer) doesn't output anything or is outputting garbled characters.

1. Make sure that the serial device's power is turned on and that the device is on-line.
2. Verify that the device is plugged into the correct serial port on the rear of the computer.
3. Verify that the attached serial device works by attaching it to a serial port that is working and configured correctly. If the serial device does not work, either the cable or the serial device has a problem. If the serial device works, the problem may be due to the onboard I/O or the address setting.
4. Make sure the COM settings and I/O address are configured correctly.

Keyboard

Nothing happens when a key on the keyboard was pressed.

1. Make sure the keyboard is properly connected.
2. Make sure there are no objects resting on the keyboard and that no keys are pressed during the booting process.

System Board

1. Make sure the add-in card is seated securely in the expansion slot. If the add-in card is loose, power off the system, re-install the card and power up the system.
2. Check the jumper settings to ensure that the jumpers are properly set.
3. Verify that all memory modules are seated securely into the memory sockets.
4. Make sure the memory modules are in the correct locations.
5. If the board fails to function, place the board on a flat surface and seat all socketed components. Gently press each component into the socket.
6. If you made changes to the BIOS settings, re-enter setup and load the BIOS defaults.

Appendix E - BIOS Status Code

Status Code Ranges

Status Code Range	Description
0x01 – 0x0F	SEC Status Codes & Errors
0x10 – 0x2F	PEI execution up to and including memory detection
0x30 – 0x4F	PEI execution after memory detection
0x50 – 0x5F	PEI errors
0x60 – 0xCF	DXE execution up to BDS
0xD0 – 0xDF	DXE errors
0xE0 – 0xE8	S3 Resume (PEI)
0xE9 – 0xEF	S3 Resume errors (PEI)
0xF0 – 0xF8	Recovery (PEI)
0xF9 – 0xFF	Recovery errors (PEI)

Standard Status Codes

SEC Status Codes

Status Code	Description
0x0	Not used
Progress Codes	
0x1	Power on. Reset type detection (soft/hard).
0x2	AP initialization before microcode loading
0x3	North Bridge initialization before microcode loading
0x4	South Bridge initialization before microcode loading
0x5	OEM initialization before microcode loading
0x6	Microcode loading
0x7	AP initialization after microcode loading
0x8	North Bridge initialization after microcode loading
0x9	South Bridge initialization after microcode loading
0xA	OEM initialization after microcode loading
0xB	Cache initialization
SEC Error Codes	
0xC – 0xD	Reserved for future AMI SEC error codes
0xE	Microcode not found
0xF	Microcode not loaded

PEI Status Codes

Status Code	Description
Progress Codes	
0x10	PEI Core is started
0x11	Pre-memory CPU initialization is started
0x12	Pre-memory CPU initialization (CPU module specific)
0x13	Pre-memory CPU initialization (CPU module specific)
0x14	Pre-memory CPU initialization (CPU module specific)
0x15	Pre-memory North Bridge initialization is started
0x16	Pre-Memory North Bridge initialization (North Bridge module specific)
0x17	Pre-Memory North Bridge initialization (North Bridge module specific)
0x18	Pre-Memory North Bridge initialization (North Bridge module specific)
0x19	Pre-memory South Bridge initialization is started
0x1A	Pre-memory South Bridge initialization (South Bridge module specific)
0x1B	Pre-memory South Bridge initialization (South Bridge module specific)
0x1C	Pre-memory South Bridge initialization (South Bridge module specific)
0x1D – 0x2A	OEM pre-memory initialization codes
0x2B	Memory initialization. Serial Presence Detect (SPD) data reading
0x2C	Memory initialization. Memory presence detection
0x2D	Memory initialization. Programming memory timing information
0x2E	Memory initialization. Configuring memory
0x2F	Memory initialization (other).
0x30	Reserved for ASL (see ASL Status Codes section below)
0x31	Memory Installed
0x32	CPU post-memory initialization is started
0x33	CPU post-memory initialization. Cache initialization
0x34	CPU post-memory initialization. Application Processor(s) (AP) initialization
0x35	CPU post-memory initialization. Boot Strap Processor (BSP) selection
0x36	CPU post-memory initialization. System Management Mode (SMM) initialization
0x37	Post-Memory North Bridge initialization is started
0x38	Post-Memory North Bridge initialization (North Bridge module specific)
0x39	Post-Memory North Bridge initialization (North Bridge module specific)

0x3A	Post-Memory North Bridge initialization (North Bridge module specific)
0x3B	Post-Memory South Bridge initialization is started
0x3C	Post-Memory South Bridge initialization (South Bridge module specific)
0x3D	Post-Memory South Bridge initialization (South Bridge module specific)
0x3E	Post-Memory South Bridge initialization (South Bridge module specific)
0x3F-0x4E	OEM post memory initialization codes
0x4F	DXE IPL is started
PEI Error Codes	
0x50	Memory initialization error. Invalid memory type or incompatible memory speed
0x51	Memory initialization error. SPD reading has failed
0x52	Memory initialization error. Invalid memory size or memory modules do not match.
0x53	Memory initialization error. No usable memory detected
0x54	Unspecified memory initialization error.
0x55	Memory not installed
0x56	Invalid CPU type or Speed
0x57	CPU mismatch
0x58	CPU self test failed or possible CPU cache error
0x59	CPU micro-code is not found or micro-code update is failed
0x5A	Internal CPU error
0x5B	reset PPI is not available
0x5C-0x5F	Reserved for future AMI error codes
S3 Resume Progress Codes	
0xE0	S3 Resume is started (S3 Resume PPI is called by the DXE IPL)
0xE1	S3 Boot Script execution
0xE2	Video repost
0xE3	OS S3 wake vector call
0xE4-0xE7	Reserved for future AMI progress codes
0xE0	S3 Resume is started (S3 Resume PPI is called by the DXE IPL)
S3 Resume Error Codes	
0xE8	S3 Resume Failed in PEI
0xE9	S3 Resume PPI not Found
0xEA	S3 Resume Boot Script Error
0xEB	S3 OS Wake Error
0xEC-0xEF	Reserved for future AMI error codes
Recovery Progress Codes	
0xF0	Recovery condition triggered by firmware (Auto recovery)
0xF1	Recovery condition triggered by user (Forced recovery)
0xF2	Recovery process started

0xF3	Recovery firmware image is found
0xF4	Recovery firmware image is loaded
0xF5-0xF7	Reserved for future AMI progress codes
Recovery Error Codes	
0xF8	Recovery PPI is not available
0xF9	Recovery capsule is not found
0xFA	Invalid recovery capsule
0xFB – 0xFF	Reserved for future AMI error codes

PEI Beep Codes

# of Beeps	Description
1	Memory not Installed
1	Memory was installed twice (InstallPeiMemory routine in PEI Core called twice)
2	Recovery started
3	DXEIPL was not found
3	DXE Core Firmware Volume was not found
7	Reset PPI is not available
4	Recovery failed
4	S3 Resume failed

DXE Status Codes

Status Code	Description
0x60	DXE Core is started
0x61	NVRAM initialization
0x62	Installation of the South Bridge Runtime Services
0x63	CPU DXE initialization is started
0x64	CPU DXE initialization (CPU module specific)
0x65	CPU DXE initialization (CPU module specific)
0x66	CPU DXE initialization (CPU module specific)
0x67	CPU DXE initialization (CPU module specific)
0x68	PCI host bridge initialization
0x69	North Bridge DXE initialization is started
0x6A	North Bridge DXE SMM initialization is started
0x6B	North Bridge DXE initialization (North Bridge module specific)
0x6C	North Bridge DXE initialization (North Bridge module specific)
0x6D	North Bridge DXE initialization (North Bridge module specific)
0x6E	North Bridge DXE initialization (North Bridge module specific)
0x6F	North Bridge DXE initialization (North Bridge module specific)

0x70	South Bridge DXE initialization is started
0x71	South Bridge DXE SMM initialization is started
0x72	South Bridge devices initialization
0x73	South Bridge DXE Initialization (South Bridge module specific)
0x74	South Bridge DXE Initialization (South Bridge module specific)
0x75	South Bridge DXE Initialization (South Bridge module specific)
0x76	South Bridge DXE Initialization (South Bridge module specific)
0x77	South Bridge DXE Initialization (South Bridge module specific)
0x78	ACPI module initialization
0x79	CSM initialization
0x7A – 0x7F	Reserved for future AMI DXE codes
0x80 – 0x8F	OEM DXE initialization codes
0x90	Boot Device Selection (BDS) phase is started
0x91	Driver connecting is started
0x92	PCI Bus initialization is started
0x93	PCI Bus Hot Plug Controller Initialization
0x94	PCI Bus Enumeration
0x95	PCI Bus Request Resources
0x96	PCI Bus Assign Resources
0x97	Console Output devices connect
0x98	Console input devices connect
0x99	Super IO Initialization
0x9A	USB initialization is started
0x9B	USB Reset
0x9C	USB Detect
0x9D	USB Enable
0x9E – 0x9F	Reserved for future AMI codes
0xA0	IDE initialization is started
0xA1	IDE Reset
0xA2	IDE Detect
0xA3	IDE Enable
0xA4	SCSI initialization is started
0xA5	SCSI Reset
0xA6	SCSI Detect
0xA7	SCSI Enable
0xA8	Setup Verifying Password
0xA9	Start of Setup
0xAA	Reserved for ASL (see ASL Status Codes section below)

0xAB	Setup Input Wait
0xAC	Reserved for ASL (see ASL Status Codes section below)
0xAD	Ready To Boot event
0xAE	Legacy Boot event
0xAF	Exit Boot Services event
0xB0	Runtime Set Virtual Address MAP Begin
0xB1	Runtime Set Virtual Address MAP End
0xB2	Legacy Option ROM Initialization
0xB3	System Reset
0xB4	USB hot plug
0xB5	PCI bus hot plug
0xB6	Clean-up of NVRAM
0xB7	Configuration Reset (reset of NVRAM settings)
0xB8 – 0xBF	Reserved for future AMI codes
0xC0 – 0xCF	OEM BDS initialization codes
DXE Error Codes	
0xD0	CPU initialization error
0xD1	North Bridge initialization error
0xD2	South Bridge initialization error
0xD3	Some of the Architectural Protocols are not available
0xD4	PCI resource allocation error. Out of Resources
0xD5	No Space for Legacy Option ROM
0xD6	No Console Output Devices are found
0xD7	No Console Input Devices are found
0xD8	Invalid password
0xD9	Error loading Boot Option (LoadImage returned error)
0xDA	Boot Option is failed (StartImage returned error)
0xDB	Flash update is failed
0xDC	Reset protocol is not available

DXE Beep Codes

# of Beeps	Description
4	Some of the Architectural Protocols are not available
5	No Console Output Devices are found
5	No Console Input Devices are found
1	Invalid password
6	Flash update is failed
7	Reset protocol is not available
8	Platform PCI resource requirements cannot be met

OEM-Reserved Status Code Ranges

Status Code	Description
0x5	OEM SEC initialization before microcode loading
0xA	OEM SEC initialization after microcode loading
0x1D – 0x2A	OEM pre-memory initialization codes
0x3F – 0x4E	OEM PEI post memory initialization codes
0x80 – 0x8F	OEM DXE initialization codes
0xC0 – 0xCF	OEM BDS initialization codes

ACPI/ASL Status Codes

Status Code	Description
0x01	System is entering S1 sleep state
0x02	System is entering S2 sleep state
0x03	System is entering S3 sleep state
0x04	System is entering S4 sleep state
0x05	System is entering S5 sleep state
0x10	System is waking up from the S1 sleep state
0x20	System is waking up from the S2 sleep state
0x30	System is waking up from the S3 sleep state
0x40	System is waking up from the S4 sleep state
0xAC	System has transitioned into ACPI mode. Interrupt controller is in PIC mode.
0xAA	System has transitioned into ACPI mode. Interrupt controller is in APIC mode.